

The background of the entire page is a photograph of a university building. In the upper half, a large, dark, ribbed dome is visible. In the lower half, a stone archway with the words "GEORGE WASHINGTON" carved into it is shown. The scene is framed by out-of-focus pink cherry blossoms in the foreground.

THE GEORGE WASHINGTON UNIVERSITY UNDERGRADUATE PROGRAMS BULLETIN

2013-2014

Mission Statement of The George Washington University

The George Washington University, an independent academic institution chartered by the Congress of the United States in 1821, dedicates itself to furthering human well-being. The University values a dynamic, student-focused community stimulated by cultural and intellectual diversity and built upon a foundation of integrity, creativity, and openness to the exploration of new ideas.

The George Washington University, centered in the national and international crossroads of Washington, D.C., commits itself to excellence in the creation, dissemination, and application of knowledge.

To promote the process of lifelong learning from both global and integrative perspectives, the University provides a stimulating intellectual environment for its diverse students and faculty. By fostering excellence in teaching, the University offers outstanding learning experiences for full-time and part-time students in undergraduate, graduate, and professional programs in Washington, D.C., the nation, and abroad. As a center for intellectual inquiry and research, the University emphasizes the linkage between basic and applied scholarship, insisting that the practical be grounded in knowledge and theory. The University acts as a catalyst for creativity in the arts, the sciences, and the professions by encouraging interaction among its students, faculty, staff, alumni, and the communities it serves.

The George Washington University draws upon the rich array of resources from the National Capital Area to enhance its educational endeavors. In return, the University, through its students, faculty, staff, and alumni, contributes talent and knowledge to improve the quality of life in metropolitan Washington, D.C.

Information in this bulletin is generally accurate as of January 2013. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.

Program information needed to fulfill a major appears under the name of the department or program concerned in Columbian College of Arts and Sciences. For the School of Business, the School of Engineering and Applied Science, the Elliott School of International Affairs, and the School of Public Health and Health Services, program information appears under the school's entry.

Depending on the degree program, students must fulfill program requirements stated in the bulletin in effect at the time they matriculate or declare their major. Any subsequent changes in programs that may appear in future bulletins do not affect the program a student has already entered.

The entries under Courses of Instruction represent departments and programs, rather than all categories of courses taught. For example, to find Chinese, Japanese, Korean, or Vietnamese courses, look under East Asian Languages and Literatures. There are many cross-references to help the reader.

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THE ACADEMIC CALENDAR 2013–2014

August 2013

S	M	T	W	T	F	S
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04	05	06	07	08	09	10
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September 2013

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January 2014

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May 2014

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June 2014

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29	30					

July 2014

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2013 Fall Semester

<i>August 26</i>	Classes begin
<i>September 2</i>	Labor Day (holiday)
<i>Aug. 26–Sept. 6</i>	Late registration
<i>October 1</i>	Applications due for winter graduation
<i>November 1</i>	Registration for spring semester classes begins*
<i>November 27–30</i>	Thanksgiving holiday
<i>December 3</i>	Makeup classes
<i>December 7</i>	Last day of regular fall semester classes
<i>December 9–10</i>	Reading days
<i>December 11–19</i>	Examination period

2014 Spring Semester

<i>January 13</i>	Classes begin
<i>January 20</i>	Martin Luther King, Jr., Day (holiday)
<i>January 13–23</i>	Late registration
<i>February 1</i>	Applications due for May graduation
<i>February 17</i>	George Washington's birthday observed (holiday)
<i>March 10–15</i>	Spring recess
<i>March 21</i>	Registration for fall semester classes begins*
<i>April 28</i>	Last day of regular spring semester classes

<i>April 29</i>	Makeup classes
<i>May 1–2</i>	Reading days
<i>May 5–13</i>	Examination period
<i>May 18</i>	Commencement

*Registration dates are tentative; consult the Schedule of Classes.

The Schools

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Dean P. Barratt / B. Vinson III (as of August 2013)

Executive Associate Dean R.J. Guenther

Associate Deans R.K. Packer, G.M. Schulz, C.H. Sterling, D.H. Ullman, T.G. Wallace

Since its founding in 1821, Columbian College, the original college of liberal arts and sciences of The George Washington University, has been the cornerstone of the campus community. Columbian College of Arts and Sciences today houses all undergraduate and graduate programs in the arts and sciences, offering bachelor's, master's, and doctoral degrees.

The rich and diverse arts and sciences curriculum is designed to strengthen the student's ability to analyze the social, cultural, and physical environment and to communicate findings in an articulate fashion. These purposes are accomplished by means of the study of various disciplines within the humanities, the social sciences, and the mathematical and natural sciences.

Students may elect one of more than 50 departmental or interdisciplinary majors; they may also elect double majors or individualized degree programs. Dean's Seminars constitute a set of courses available only to first-year Columbian College students; the seminars offer a focused introduction to issues of particular significance.

The College offers its undergraduates opportunities for pre-professional education in many fields and for internships in a stimulating urban environment.

The Bachelor's Degrees

Columbian College offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Fine Arts. In cooperation with the School of Medicine and Health Sciences, a seven-year integrated Bachelor of Arts/Doctor of Medicine is offered.

One hundred twenty hours of academic course work must be passed with a cumulative grade-point average of at least 2.0. Note that some courses outside Columbian College (notably lifestyle, sport, and physical activity courses) do not count toward the 120-credit requirement. General education, major, and other requirements described below must be met.

Each student must declare a major during the sophomore year. A student will normally declare a major in the third full-time semester but not later than the registration period during the fourth full-time semester or the semester following completion of 45 credit hours, whichever comes first. A student may change the major with the consent of the dean and of the department or committee concerned; the student must meet the requirements for the new major in effect at the time the change is approved. At least 60 hours of course work must be taken outside the major-field department or major program (this does not apply to the Bachelor of Fine Arts curriculum).

Residence

Students must complete at least 60 of the total number of credit hours required for the degree at or through the University and must complete 45 of the final 60 hours in residence in the Columbian College, including at least 12 hours of upper-division course work in the major field. (Students who study abroad must complete 45 of their final 75 hours in residence. No more than 30 credit hours may be transferred through study abroad at

institutions other than those affiliated with GW.) Nine of the final 15 hours must be completed in residence.

Students wishing to transfer from another division of the University into a degree program in Columbian College must have a cumulative grade-point average of at least 2.0 at the time of their last completed semester before transfer. Courses applicable to the degree taken while registered in any division of GW in the semester or summer sessions immediately prior to admission to degree candidacy in Columbian College are counted as courses in residence.

Advising

Students have the responsibility for determining their schedules and meeting degree requirements. Freshmen entering Columbian College are assigned a professional academic advisor who will advise them through graduation. Once students declare their major, they are also advised by the faculty of their major department. Freshmen and transfer students who have not declared a major are required to meet with a professional advisor prior to registering each semester. A CCAS advising hold prevents registration until students who have not declared a major have consulted with their advisors.

Professional advisors are available year-round in the Office of Undergraduate Studies to discuss academic issues and for an accurate appraisal of procedural issues that may arise in any student's program of study. Specialized advising is provided to students interested in health professions, law, and other graduate programs.

The Writing Center offers walk-in and by-appointment assistance. Personal counseling is available through the office of the Dean of Students, the Counseling Center,

Disability Support Services, the Multicultural Student Services Office, and the International Services Office.

Students concerned about their academic performance should see their professors, their faculty advisor, and their professional advisor.

Academic Standing

A student who is not suspended or on probation is considered to be in good standing.

The following rules governing probation and suspension are applicable to students enrolled for a full-time program (12 credit hours or more) during the fall or spring semester. Students enrolled for fewer than 12 credits during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their cumulative record, with a “semester” considered to be the time interval in which at least 12 credits have accrued.

Probation—A student whose cumulative grade-point average is below 2.0 but above 1.0 after attempting a minimum of 24 credit hours is placed on probation. The course load of a student on probation may be no more than 13 credit hours. A student returns to good standing if, after a first or second semester on probation, the cumulative grade-point average is raised to 2.0 or more.

Suspension—The following circumstances constitute grounds for suspension: (1) a cumulative grade-point average below 1.0 after attempting a minimum of 24 credit hours; (2) failure to attain a cumulative grade-point average of 2.0 or more after two successive full-time semesters (or 24 additional credit hours attempted) on probation. Suspension will take effect at the end of the second consecutive semester under 2.0 immediately following two semesters on probation.

Once suspended, students may not register for or complete any courses in any division at The George Washington University. Suspended students may apply for readmission following completion of the term of suspension. Final dates for applying for readmission are the same as those governing undergraduate admission (see Admissions). A suspended student seeking readmission cannot apply for readmission until he or she has been away from GW for at least one semester. To be considered for readmission, a student suspended for academic reason must complete at least 12 credit hours of course work in one semester at an accredited institution of higher learning and maintain at least a 3.0 grade-point average. A student suspended twice for poor scholarship will not be readmitted.

Semester Warning—A first-semester freshman whose cumulative grade-point average is less than 2.0 will be issued a warning notice at the end of the semester and will be required to take corrective measures (e.g., limitation of course load to no more than 13 credit hours).

Timely Progress Toward the Degree—Students who fail to make adequate and timely progress toward the degree, through repeated leaves or repeated failure to complete an appropriate number of credits per semester, may be dismissed from the University (see Right to Dismiss Students under University Regulations). Students dismissed on these grounds may apply for readmission after supplying sufficient evidence of academic promise.

Dean's List—The name of any student who completes 15 credit hours or more of graded course work in any one semester and attains a semester grade-point average that places the student in the highest 20% of CCAS students, with no grades below *B–* and no grade of Incomplete or Unauthorized Withdrawal (*Z*), will be placed on the Dean's List for

that semester. A course taken on a Pass/No Pass basis beyond the 15-hour minimum does not affect the student's eligibility for the Dean's List, nor are the credit hours of such a course computed in the above figures. However, a grade of No Pass in a credit-bearing course disqualifies the student from the Dean's List. Once established for a given semester, Dean's List eligibility is not recomputed.

General Education Curriculum

The general education curriculum of Columbian College educates students to engage in active intellectual inquiry by developing analytical skills, communication skills, and diverse perspectives. Across a range of disciplines, students acquire enhanced analytic skills in quantitative and scientific reasoning and critical and creative thinking, along with a global and cross-cultural perspective, local/civic engagement, and effective communication skills. A full statement of the structure of the general education curriculum, including its more specific learning goals, is found on the Columbian College website.

General education requirements include 24 credits of approved analytic courses: 3 credits in mathematics or statistics—approved courses achieve learning goals for quantitative reasoning; 6 credits in natural and/or physical laboratory sciences—approved courses achieve learning goals for scientific reasoning; 6 credits in social sciences—approved courses achieve learning goals in quantitative, scientific, critical, or creative thinking; 6 credits in humanities and 3 credits in art (visual, performing, critical, and historical practices)—approved courses achieve learning goals in critical or creative thinking.

In addition, UW 1020 and two Writing in the Disciplines (WID) courses are required. One of the two WID courses may also count toward the 24 credits of analytic course work.

UW 1020 must be passed before enrolling in the WID courses that are used to fulfill this requirement.

Of the analytic courses, students must take one that includes a global or cross-cultural perspective and one that includes local/civic engagement. Students must take one course that includes a component of oral communication; the course may fulfill an analytic, WID, or major requirement as well. Courses taken to fulfill any of the general education requirements may also be counted toward the major.

With some exceptions made for transfer students, courses fulfilling these requirements must be completed in residence at GW.

The Major

In order to declare a major, all students must receive academic guidance from a faculty advisor in the major department and submit a Declaration of Major form, signed by the major advisor, to the Office of Undergraduate Studies. The Declaration of Major form must be submitted no later than the registration period during the student's fourth full-time semester or the semester following the completion of 45 credit hours (whichever comes first). No student is considered to have declared a major until this process is completed. Thereafter, the student receives academic guidance from a faculty advisor in the major department in order to register for all subsequent semesters. In most cases, filing of the approved declaration form assures the student of admission to the major declared; however, if space, equipment, or other requirements compel a department or major program to limit the number of students in that major, admission to the major may be on a selective or space-available basis. Majors with selective admission are communication, journalism and mass communication, political communication, and English and creative writing.

Major Fields

All fields listed below (except biological anthropology, biophysics, and statistics) may lead to the Bachelor of Arts degree; a Bachelor of Science degree may be elected in those fields indicated by an asterisk. In addition to the fields listed here, students may pursue a Bachelor of Fine Arts in interior design.

Africana Studies

American Studies

Anthropology

Arabic Studies

Archaeology

Art History

Art History and Fine Arts

*Biological Anthropology

*Biology

*Biophysics

*Chemistry

Chinese Language and Literature

Classical Studies

Communication

Criminal Justice

Dance

Dramatic Literature

*Economics

English

English and Creative Writing

Environmental Studies

Fine Arts

French Language, Literature, and Culture

Geography

*Geological Sciences

German Language and Literature

History

Human Services

Japanese Language and Literature

Journalism and Mass Communication

Judaic Studies

*Mathematics

Music

Organizational Sciences

Peace Studies

Philosophy

*Physics

Political Communication

Political Science

Psychology

Religion

Russian Language and Literature

Sociology

Spanish and Latin American Languages, Literatures, and Cultures

Speech and Hearing Science

*Statistics

Theatre

Women's Studies

Scholarship Performance in the Major

Majors are defined in terms of credit hours, required courses, and the attainment of grades no lower than *C–* in the minimum number of upper-division courses required in the major field. If a student receives a grade of *D+*, *D*, or *D–* in an upper-division course specifically required in the major, the major department or program may permit the course to satisfy a curricular requirement even though it will not count toward the minimum number of hours required for the major. However, the department or program may instead require the student to repeat the course until a satisfactory grade (*C–* or better) is earned. Once the student has completed the course with a satisfactory grade, credit hours earned the first time the course was taken will count toward the minimum number of hours required in the major. Credit earned for the repetition will not count toward the degree. The minimum specific requirements for majors are listed under the department concerned in Courses of Instruction. The chair of the department, or designated departmental advisor, should be consulted before registration concerning the student's program of courses; the entire program, including electives, must be approved by the department. The student is also

expected to consult a departmental advisor in all matters affecting the program of studies, such as changes, substitutions, withdrawals, or transfer of credit from other institutions.

Double Majors

Students who complete the requirements of two majors in Columbian College (such as mathematics and physics or history and economics) may graduate with a double major. Consult with advisors in the two departments concerned before officially declaring both majors on the Declaration of Major form available in the Office of Undergraduate Studies.

A Columbian College student may pursue a second major in the Elliott School of International Affairs or the School of Engineering and Applied Science, provided that permission to do so has been obtained from the appropriate administrative office of the Elliott School or SEAS. Students in the Elliott School or SEAS may also take a second major (excluding majors in communication, journalism and mass communication, political communication, English and creative writing, and special interdisciplinary programs) in Columbian College. Students wishing to pursue one of these options must request approval through the appropriate department and Columbian College's Office of Undergraduate Studies. In all cases, students must complete the general education requirements and a major in their home school in order to graduate.

Double majors do not result in two degrees. See Double Majors and Double Degrees under University Regulations.

Special Interdisciplinary Programs

A student may propose a special interdisciplinary major program, in consultation with appropriate academic advisors. The proposed program must have valid and clearly defined academic goals to be considered for approval. Only students with a *B* average or better are

eligible to propose a special interdisciplinary program. The proposal must be submitted for approval by the end of the fourth semester or the semester following completion of 45 credit hours (whichever comes first).

Approval of the proposed program rests with the Committee on Undergraduate Studies, which must also approve the proposed name of the program and the composition of the committee that will oversee it. At least 45 credit hours of the program must be completed in Columbian College. Because of the broad scope of an interdisciplinary program, it may not be part of a double major.

At the discretion of the committee overseeing the program, the student must either write an acceptable senior thesis or pass a comprehensive examination in the last semester of study toward the degree. Students may apply for Special Honors by registering for CCAS 4191. To be eligible, students must meet the requirements for Special Honors stated under University Regulations, must have a cumulative grade-point average of at least 3.5, and must receive a Pass With Distinction from all members of the major committee on the final project or thesis.

Minors and Secondary Fields

Students who wish to familiarize themselves with a field outside their major may graduate with a minor in addition to the major. Not all Columbian College departments offer undergraduate minors; the requirements prescribed by those that do are listed under the department concerned. A student interested in a minor should consult a faculty advisor in the department concerned and declare both major and minor programs on the Declaration of Major form available in the Office of Undergraduate Studies. Students may pursue at most two majors.

At least one-half of the course work required for a minor must be done in residence. Grades of C– or better must be earned in upper-division courses, including such courses transferred as advanced standing from another institution. Courses passed with a grade below C– may be used to fulfill a minor field curricular requirement but may not be counted toward the total number of credit hours required for the minor.

When taken by a student enrolled at the University in a school other than Columbian College, such minors are referred to as secondary fields. The same curricular and scholarship requirements apply to secondary fields as to minors.

Minors are available in the following fields:

Africana Studies

American Studies

Applied Ethics

Arabic Studies

Archaeology

Art History

Art History and Fine Arts

Biological Anthropology

Biology

Chemistry

Chinese Language and Literature

Classical Studies

Communication

Creative Writing

Criminal Justice

Cross-Cultural Communication

Dance

Economics

English

Film Studies

Fine Arts

French Language, Literature, and Culture

General Anthropology

Geographic Information Systems

Geography

Geological Sciences

German Language and Literature

History

Human Services

Italian Language and Literature

Japanese Language and Literature

Jazz Studies

Journalism and Mass Communication

Judaic Studies

Korean Language and Literature

LGBT and Sexuality Studies

Linguistics

Logic

Mathematics

Mind–Brain Studies

Music

Organizational Communication

Organizational Sciences

Peace Studies

Philosophy

Physics

Political Science

Psychology

Religion

Russian Language and Literature

Sociocultural Anthropology

Sociology

Spanish and Latin American Languages, Literatures, and Cultures

Speech and Hearing Science

Statistics

Theatre

Women's Studies

Just as students enrolled at the University but outside the College may pursue Columbian College minors as secondary fields, such study is permitted Columbian College students in other schools of the University. Secondary fields are available in the School of Engineering

and Applied Science, the School of Business, the School of Medicine and Health Sciences, the School of Public Health and Health Services, and the Elliott School of International Affairs. A secondary field in naval science and a University-wide minor in sustainability are offered as well. Columbian College students are limited in the number of hours they may take in courses outside the College (“professional credit” courses). Refer to Courses Outside Columbian College, below.

General CCAS Policies

Incompletes—Conditions under which the symbol *I* (Incomplete) may be assigned are described under University Regulations. In Columbian College, the conditions for granting a notation of *I* should be documented by a written contract between the faculty member and the student. Contracts must be on official Columbian College forms and a copy must be on file in the departmental office. A notation of Incomplete disqualifies the student for inclusion in the Dean’s List for the semester in which it is received.

Changing an Incomplete—Incomplete work must be completed as specified in the contract but no later than one calendar year from the last day of the examination period of the semester or summer session in which the symbol *I* was assigned. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean for additional time in which to complete the work of the course. Such petitions should be submitted within a year of the assignment of the symbol *I*. When work for the course is completed, the grade earned will be indicated in the form of *I*, followed by the grade. The indication of *I* cannot be removed from the transcript. An Incomplete that is not changed within this period automatically becomes an *IF*. The symbol *I* cannot be changed by reregistering for the course here or by taking its equivalent elsewhere.

Pass/No Pass Option—A junior or senior student in Columbian College who is in good standing may, with the approval of the instructor and the dean, take one course a semester for a grade of *P*, Pass, or *NP*, No Pass. No student will be allowed to take more than four pass/no pass courses under this regulation. The student may, however, also receive grades of *P/NP* in proseminars for certain majors and in other courses that are graded *P/NP* only. Courses required for the College's general curriculum requirements or in the student's major or minor field (including those courses required for the major that are offered by other departments) may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in this University. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of the eighth week of class.

Preliminary Placement Examinations—All foreign language departments require students to take placement tests to determine the level of proficiency or eligibility for languages studied in high school. The student is placed in an appropriate course on the basis of these tests. Students may not register for a course other than that determined by the placement test without written permission of the language department. There is no charge to the student for placement tests, and no credit (advanced standing) is awarded for courses bypassed or waived as a result of these tests.

Students who wish to register in Math 1051, 1220, 1231, or 1252 are required, prior to registration, to take a placement examination or to have achieved indicated scores on an SAT subject test in mathematics.

Earning Credit by Examination—Assuming there is no duplication of course credit earned, a maximum of 24 credit hours may be assigned for any combination of the following:

College Board Advanced Placement Tests and International Baccalaureate Higher-Level Examinations—See Admissions. Credit may be granted for college-level courses taken in an approved secondary school if substantiated by satisfactory performance on these tests.

Special Departmental Examinations—Some departments in Columbian College offer a special examination covering the subject matter of a specific course. The student must offer evidence of sufficient background to have a reasonable command of the subject matter. Departments reserve the right to deny such requests. Assigning credit by special departmental examinations will depend on the department's evaluation of the examination paper. These examinations will normally be of at least three hours' duration. A fee is charged for preparation, administration, and grading of each course examination. Credit by special departmental examination is not permitted for the first two years of college-level courses in a native language other than English. A student who has previously taken examinations to waive course requirements may not subsequently take examinations for credit in the same courses.

Waiving Introductory Courses by Examination—Some departments in Columbian College offer periodic waiver examinations for introductory courses. Such examinations may be attempted at the option of the student; a fee is charged. Specific departments should be consulted for further details. Passing a waiver examination does not entitle a student to any credit toward the degree.

Courses Outside Columbian College—No more than 18 credit hours of courses in schools of the University other than Columbian College may count toward the 120 credits required for graduation with a bachelor's degree in Columbian College. Pursuing a secondary field may increase the 18-hour limit, with prior permission of the dean of Columbian College. No credit toward the degree is allowed for lifestyle, sport, and physical activity courses. No more than 45 credit hours of courses completed by a student while in nondegree status may be applied toward a degree in Columbian College.

Naval Science—For information on naval science courses and the Naval Reserve Officers Training Corps, see Naval Science, under Courses of Instruction.

Academic Work Load—To encourage academic performance of high quality, the College limits the student's work load. After the freshman year, a full-time student who is not on probation may take a course load of up to 19 credit hours. The 18th and all subsequent hours require additional tuition charges. A full-time student who, during the immediately preceding semester, has received no grades below *B–* and has earned grades of *A* or *A–* in three courses totaling at least 9 credit hours may take 21 credits. Students may not register for more than 21 credits without approval of the dean. The number of credits students on probation may take is determined by the Committee on Undergraduate Studies.

Earning an Additional Hour of Credit—In exceptional circumstances and with the prior approval in writing of the instructor and the dean, a student may register for and earn an additional hour of credit in certain appropriate upper-division courses within the College by doing a significant amount of extra work as assigned and supervised by the instructor.

Preparation for Medical School

A student who plans to apply to medical school fulfills the general requirements of Columbian College stated above and may select any major in Columbian College. Advice about academic preparation for medical school is provided by the health professions advisor in the Office of Undergraduate Studies. For admission to most medical schools, the student must have a minimum of 90 credit hours applicable toward a bachelor's degree in an approved college of arts and sciences; the 90 hours must include:

Biology—8 credit hours, including laboratory. This may be either in general biology or zoology but may not include separately credited courses in botany.

Chemistry—8 credit hours of general inorganic chemistry (which may include qualitative analysis), including laboratory, and 8 credit hours of organic chemistry, including 2 hours of laboratory.

Physics—8 credit hours, including laboratory.

English—6 credit hours in the usual introductory English composition courses or their equivalents (fulfilled by the University Writing Program at GW).

Many medical schools have additional entrance requirements, which may include courses in biochemistry, genetics, and mathematics; even when such courses are not required, they are strongly recommended. With the exception of the specified requirements, applicants are urged to follow their personal interests in developing their course of study.

Seven-Year Integrated Bachelor of Arts/Doctor of Medicine—In addition to the early selection program described under the School of Medicine and Health Sciences, a seven-year integrated B.A./M.D. program has been designed for students of high ability and maturity who have decided, before applying to college, that they wish to become physicians

and want to accomplish that goal in a shorter amount of time. Detailed information on this program is available through the College.

Preparation for Law School

Because a broad liberal education is the best undergraduate preparation for law school, Columbian College does not prescribe a prelegal curriculum. Advice about academic preparation for law school is provided by the pre-law advisor in the Office of Undergraduate Studies.

Second Bachelor's Degree

Columbian College graduates who wish to receive a second bachelor's degree following graduation must satisfy the general College requirements and the requirements of their new major and degree and must complete 30 hours in residence in Columbian College.

SCHOOL OF BUSINESS

Dean D. Guthrie

Vice Deans S. Kang, P.W. Wirtz

Associate Deans R. Achrol (Interim), I.G. Bajeux-Besnainou, L. Riddle

Organized as the School of Government in 1928, the School of Business has been responsible for over half a century for the professional development of individuals assuming leadership roles in society. The School has eight departments—Accountancy, Decision Sciences, Finance, Information Systems and Technology Management, International Business, Management, Marketing, and Strategic Management and Public Policy. The use of a multidisciplinary approach in educational programming helps prepare both the generalist and specialist for professional careers in today's complex, organizational society.

The School of Business is a member of AACSB International—The Association to Advance Collegiate Schools of Business, and its undergraduate and graduate programs are accredited by the Association.

Vision—To be a preeminent business school recognized for scholarly research, teaching excellence, and innovative curricula focused on the responsible management of organizations in the global environment.

Mission—To deliver an outstanding education, advance knowledge, and provide practical experience in diverse organizational settings, leveraging the unique advantages of our location in the Washington, D.C., area, in order to enhance the capacities of students, faculty, staff, alumni, and the business community to be productive and principled members of society.

Values—Integrity: demanding transparency, accountability, and ethical behavior; leadership: encouraging problem solving, commitment, and entrepreneurship; scholarship: emphasizing discovery, learning, and innovation; service: responding to the needs of students, academic professions, and the community; relationships: fostering communication, collaboration, and collegiality.

The Bachelor's Degrees

The School offers programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration. The programs include foundation knowledge for business in accounting, behavioral science, economics, mathematics, and statistics.

Curricula are designed to provide perspectives on ethical and global issues, the influence of political, social, legal and regulatory, environmental, and technological issues, and the impact of demographic diversity on organizations. A Bachelor of Business Administration

student selects a field of concentration from among business economics and public policy; finance; information systems; international business; marketing; sport, event, and hospitality management; or, with faculty approval, may structure an individualized field of concentration reflecting a specific interest in management.

Residence

Of the 120 credit hours required for graduation, at least 60 credits must be completed at GW and at least 30 credits, including 27 credits in required business or accountancy courses, must be completed while registered in the School of Business. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the director of the Advising Center to pursue work elsewhere, the work of the senior or final year must be completed in the School of Business. Students who have successfully completed 60 credit hours at GW may not take courses at a community college. Excluding study abroad, students matriculated at GW may have a maximum of 9 credit hours transferred into the B.B.A. or B.Accy. program.

Assignment of Credit for Transfer Students

Certain courses taken at a two-year college (one per area up to a maximum of three courses) comparable to this School's lower-level undergraduate courses may be accepted for credit only after BAdm 4801 is successfully completed with a grade of *C* or better in the senior year.

An international student who is required to take the English for Academic Purposes writing course (EAP 1015) will be required to complete the course successfully, and assignment of credit for any previously completed courses at another institution will be held pending completion of this requirement.

To be considered for transfer to the School of Business from another division of the University, students must have a cumulative grade-point average of 2.8 or above.

Performance in quantitative courses will also be reviewed.

Scholarship Requirements

A student must have the following to graduate: (1) a minimum of 120 credit hours; (2) an overall grade-point average of at least 2.0; and (3) a grade-point average of at least 2.0 in all required upper-division B.B.A. or B.Accy. courses and concentration-related courses (the major field grade-point average). All courses taken at GW are included in the overall grade-point average calculation. Elective courses in or out of the School of Business cannot be used as substitutes for required courses in the calculation of the major field grade-point average.

Probation—A student whose grade-point average (either overall or in the major field) falls below 2.0 after completing a minimum of 12 credit hours will be placed on probation. Probation by overall grade-point average normally extends over the period in which the student attempts a maximum of 12 credit hours, which may include remedial studies as prescribed. Performance will be reviewed at the end of the next semester, and the student may be suspended at that time. Incompletes and course withdrawals are not allowed during the probation period. Probation by major field normally extends over the period in which the student attempts 6 credit hours in major field course work. Students on probation are required to meet regularly with the assigned advisor during the probationary period.

Suspension—A student whose grade-point average (either overall or in the major field) is 1.5 or below in any semester or remains below 2.0 at the end of the probationary period will be suspended. Any outstanding Incomplete at the time of suspension must be

completed or will become an *IF*. A student suspended for poor scholarship may apply for readmission after the end of the fall or spring semester following the term of suspension. To be considered for readmission, the student must submit acceptable evidence of remedial activity performed during the suspension period and of renewed potential ability to do college-level work. No advanced standing will be assigned for academic work completed while the student is suspended, but the student may petition the director of the Advising Center for consideration of advanced standing after completing a minimum of 12 credit hours of course work here and achieving a cumulative and major field GPA of at least 2.0.

A student readmitted after suspension is on probation and must maintain a current grade-point average determined by the director of the Advising Center until the cumulative and major field grade-point averages are at least 2.0. In no case will the overall probationary period after readmission exceed 24 credit hours or the major field probationary period exceed 12 credit hours. A student suspended twice for poor scholarship will not be readmitted.

Mid-Semester Warning—If a professor files an evaluation showing that a student performs unsatisfactory academic work (*C-* or below), the director of the Advising Center will inform the student of his or her status. This notice constitutes an official direction to consult with the professor and advisor immediately.

Semester Warning—Any student whose overall or major grade-point average falls between 2.0 and 2.2 will be placed on warning. Though the student's courses will not be restricted, progress during the semester will be monitored. It is the student's responsibility to meet with the assigned advisor every two weeks during the semester.

General School of Business Policies

Academic Work Load—Full-time students in good standing (2.0 overall grade-point average or higher) may register for a maximum of 17 credit hours each semester and 6 credits each summer session. A student employed more than 20 hours a week, who is in good standing, may not take more than 9 credits each semester and 3 credits each summer session. A full-time student on probation may take no more than 12 credit hours of course work; it is strongly recommended that a student on probation not be employed. Full-time students whose overall grade-point average is 3.0 or higher may take up to 18 credits each semester, with the understanding that additional tuition applies in this situation. A student employed more than 20 hours a week, whose grade-point average is 3.0 or higher, may take up to 12 credits.

Pass/No Pass Option—A junior or senior student who has a cumulative grade-point average of 2.5 or better may, with approval of the instructor, the advisor, and the director of the Advising Center, take one upper-level non-business or unrestricted elective a semester and receive a grade of *P*, Pass, or *NP*, No Pass, which will be recorded on the student's transcript but will not be reflected in the grade-point average. No student will be allowed to take more than four pass/no pass courses, with a limit of one per semester. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the last date to withdraw from a course. Required courses (including WID courses) may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in the University.

Incompletes—Conditions under which the notation of *I* (Incomplete) is assigned are described under University Regulations. The *I* must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall

or spring semester immediately following the semester or summer session in which the *I* is assigned. An Incomplete that is not changed within this period automatically becomes an *IF*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the director of the Advising Center for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The *I* cannot be changed by reregistering for the course here or by taking its equivalent elsewhere. The *I* notation remains on the student's permanent record even after the course has been successfully completed.

Dean's Honor List—The names of students who achieve a grade-point average of 3.75 or higher are placed on the Dean's Honor List for that semester. Appearance on the list is limited to (1) full-time students registered for a minimum of 12 credit hours (provided that the 12 credits are taken for a grade) and (2) part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

Independent Research Plan—A junior or senior of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of a regular, full-time member of the faculty, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally allowed when a course is taken on a class basis. A petition outlining the student's specific study plan must be submitted to the director of the Advising Center prior to beginning any independent study. Generally, a maximum of two independent studies in two separate semesters is permitted.

Secondary Fields of Study—A secondary field of study in business administration is available in the School of Business. School of Business students may pursue a secondary field in other GW schools.

Students from Other Schools Within the University—Degree candidates from other schools of the University cannot register for more than 21 credits in courses from the B.B.A. program. Typically, a maximum of 6 credits is permitted in courses from the B.Accy. program, unless an advisor recommends an additional 3 credits.

The Bachelor of Accountancy and The Bachelor of Business Administration

New undergraduate curricula, including a Bachelor of Science with a major in finance, are expected to be in place by fall 2013. Information will be available at business.gwu.edu/ugrad.

Curriculum for the First Two Years for All B.Accy. and B.B.A. Students

Freshman Year—BAdm 1001–2, 1101; UW 1020; Econ 1011–12; Math 1051, 1252; a two-course sequence chosen from Astr 1001–2, BiSc 1005–6 or 1111–12, Chem 1003–4 or 1111–12, Geol 1001–2, Phys 1011–12; two approved foreign language and culture courses chosen in consultation with the advisor.

Sophomore Year—Accy 2001, 2002; BAdm 2101, 2201, 2301, 2003; Stat 1051 or 1053; PSc 1001, 1002, or 1003; one approved 3-credit humanities elective; one approved 3-credit elective taken outside the School of Business.

Note: CSci 1020, 1023, Math 1007, 1009, 1010, 1220 (without 1221), and LSPA courses may not be used for credit toward the B.Accy. or the B.B.A. For B.Accy. students, a minimum grade-point average of 2.5 is required at the start of the junior year. For B.B.A.

students, the concentration must be selected no later than the second semester of the sophomore year.

Curriculum for the Second Two Years for All B.Accy. Students

Junior Year—Accy 3101, 3102, 3601, 3401, 3103; BAdm 3401, 3501, 3001; three approved 3-credit upper-division electives.

Senior Year—Accy 4601, 4301, 4501, 4201, 4801; BAdm 3102, 4801 (BAdm 4801 must be taken at GW); three approved 3-credit upper-division electives, two of which must be outside of the School of Business. All B.Accy students must complete the Assurance of Learning Comprehensive Exam conducted by the Department of Accountancy.

Students who intend to take the C.P.A. examination should be aware that the course work required for admission to the examination varies from state to state. Students are advised to consult the Board of Accountancy for the state in which they plan to take the examination and choose courses that meet that state's requirements.

Curriculum for the Second Two Years for All B.B.A. Students

Junior Year—BAdm 3401, 3501, 3601, 3001, 3101, 3102; Stat 2112 or 2118; two courses in the concentration; two 3-credit upper-division electives chosen in consultation with the advisor.

Senior Year—BAdm 4101, 4801 (BAdm 4801 must be taken at GW); three courses in the concentration and one related elective; four 3-credit upper-division electives chosen in consultation with the advisor (two non-business, two unrestricted).

Concentrations

The concentration consists of five courses plus a related elective chosen from a set of courses designated by the department. The concentration must be selected no later than the

second semester of the sophomore year; the student should contact the Advising Center to declare a concentration. Students may declare two concentrations, but they should note that this will increase the number of credit hours required to complete the B.B.A. Concentrations are listed below, with the courses that constitute them. In all cases, students must consult the academic advisor for an appropriate related elective.

Business Economics and Public Policy—Econ 2101 and 2102 or 2158; PSc 2216 or 2218; PSc/PAd 2217 or PSc 2104; and, with approval of the advisor, a course chosen from Anth 3513, Econ 2136 or 2181, Geog 2120, PubH 1101, or PSc 2222.

Finance—Fina 3001, 3101, and 4001 and two approved courses chosen from Fina 3201, 4101, 4201, and 4900.

Information Systems—ISTM 3119, 4120,, 4121, and two additional courses selected from 4123, 4900, and 6243.

International Business—IBus 3001 and four additional upper-division IBus courses.

Marketing—Mktg 3142, 3143, 4148, 4150, and 4149 or 4159.

Sport, Event, and Hospitality Management—event management: TStd 3001, 3101 or 3301, 4301 or 3102, 4900, and 4102; hospitality management: TStd 3001, 3301, 3302, 4301, and 4102; sport management: TStd 3001, 3101, 3102, 4101, and 4102.

Individualized Concentration—A student with a minimum GPA of 3.2 and a specific interest in some area of management may design an individualized concentration drawing on courses across the University. Past examples of approved individualized concentrations include small business management, entrepreneurship, emergency response management, media management, and performing arts management. Such a concentration consists of five courses plus a related elective selected with the guidance of faculty with expertise in the

area of interest. All such individualized concentrations must be approved in advance through an individualized concentration review committee. Interested students should discuss their ideas with the director of the Advising Center.

Five-Year Joint B.B.A./M.S.I.S.T. and B.B.A./M.T.A.

The School of Business offers two five-year joint degree programs: the Bachelor of Business Administration/Master of Science in Information Systems Technology and the Bachelor of Business Administration/Master of Tourism Administration. Students pursue the regular B.B.A. curriculum in their first three years of study and are enrolled in courses at both the undergraduate and graduate levels during the final two years. Students can apply for admission to the program when they apply for admission to the University (they must meet specified GPA and other requirements to remain in the program), or they may apply after earning 75 credits. The two degrees are awarded concurrently; there are no exceptions. Students who choose to discontinue the program at the end of four years will be required to take additional courses to complete requirements for the B.B.A.

Five-Year Dual B.Accy./M.Accy. and B.B.A./M.Accy.

Students in the five-year dual degree program leading to the Master of Accountancy first pursue either the Bachelor of Accountancy or Bachelor of Business Administration. They may apply for admission to the M.Accy. after completion of 75 credits toward the undergraduate degree and successful completion of the Graduate Management Admission Test. Students typically earn the B.Accy. or B.B.A. after four years and the M.Accy. at the end of the fifth year. The dual degree program requires 150 credit hours, with 30 graduate-level credits.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Dean D.S. Dolling

Associate Deans B. Narahari, C.E. Korman, R. Riffat

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbian University, named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering. While the organization and offerings of the school have evolved over the years, through most of its history its programs have been characterized by an emphasis on principles guiding the advancement of technology.

Through its five departments—Civil and Environmental Engineering, Computer Science, Electrical and Computer Engineering, Engineering Management and Systems Engineering, and Mechanical and Aerospace Engineering—the School of Engineering and Applied Science offers undergraduate programs leading to the Bachelor of Science (in biomedical engineering, civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and systems engineering) and the Bachelor of Arts (in applied science and technology and in computer science). Combined bachelor's/master's degree programs are available. In cooperation with the GW Law School, an integrated engineering and law program leading to the B.S. or B.A. and J.D. is offered.

The School offers graduate study leading to the degrees of Master of Science and Doctor of Philosophy and to the professional degrees of Engineer and Applied Scientist. Several graduate certificate programs are offered as well.

Extensive and varied laboratories and computing facilities support the undergraduate programs. The School strongly supports co-curricular activities to broaden and deepen its students' overall educational programs, including an extensive array of internship opportunities at government laboratories and private companies, both in the Washington area and elsewhere. Other opportunities are engineering-type team competitions, research projects, and the SEAS student government organization, the Engineers' Council.

Residence

Sixty credit hours must be completed in residence. Full-time students normally complete their programs in four years.

SEAS Regulations

Advising—Every entering undergraduate student is assigned a professional advisor to assist in orientation in the professional discipline. Faculty advisors counsel students on their programs of study, achievement and maintenance of satisfactory scholastic performance, professional development, and extracurricular activity as part of the educational process. The advisor represents the student in all cases requiring faculty action. Students must obtain their advisor's approval of their program of study prior to registration for each academic semester and summer session. The advisor's approval must be obtained before registering for a course at another institution. Until the work required for the degree is completed, students must consult with their advisors in all academic matters. However, an advisor may not deny entry into any course or activity to which the student is entitled under the regulations of the School.

Assignment of Transfer Credit—Transfer students should complete a Transfer of Credit worksheet, available in the SEAS Office of Undergraduate Student Services,

Advising, and Records and present the worksheet to the faculty advisor for approval. See Admissions in this Bulletin for more detail on residence and transfer credit policies.

Credit by Examination—See Admissions in this Bulletin for information on credit assignment for College Board Advanced Placement Tests.

Registered SEAS students may take examinations in some academic departments for waiver of or credit for a specific course upon approval of the appropriate department chair; before the test is administered, the student must have demonstrated sufficient preparation to warrant being given the test. An examination for credit is not allowed if an examination for waiver has been successfully completed.

Makeup of Credit for Waived Courses—Waiver of a required course requires approval of the student's faculty advisor and department chair. If a course required by the SEAS curriculum is waived, the corresponding credit hours must be earned by satisfactory completion of a university-level academic course, either technical or nontechnical, approved by the student's faculty advisor. Only if the substituted course would normally be considered part of the student's curriculum will the grade earned be used in determining grade-point average, Dean's List, probation, and suspension.

Scholarship Requirements—To be eligible for graduation a student must have at least (1) an overall grade-point average of 2.0, (2) an overall GPA of 2.0 for the program taken at SEAS, and (3) a GPA of 2.2 for technical courses required in the fifth through eighth semesters. All computer science courses taken in the Bachelor of Arts major in computer science are considered technical for this purpose. Grades used to calculate the grade-point average include all grades earned at GW and through the Consortium while the student is enrolled at GW. (In determining probation, suspension, or Dean's List status, the

grades used are for academic courses taken in fulfillment of degree requirements and not for remedial courses or those taken to make up deficiencies. For example, EAP courses and non-SEAS courses taken in excess of the number needed to fulfill degree requirements are not considered.)

Probation—Full-time students are placed on probation if their grade-point average is below 2.0 for one semester or if they receive more than one grade of *F* in one semester or summer session. Part-time students are placed on probation if their GPA is below 2.0 or they have received more than one grade of *F* after accumulating 12 credit hours; a new grading period is considered to begin once this accumulation is reached. Students on probation who earn a GPA of at least 2.0 (for 12 or more credit hours) during the semester on probation but also receive a grade of *F* are continued on probation; students in this category who receive two or more *F*s are suspended.

Full-time students are removed from probation when the GPA is at least 2.0 with no grade of *F* during the semester on probation. Part-time students are removed from probation when the GPA is at least 2.0 and they receive no grade of *F* for the next 12 credit hours after being placed on probation.

Suspension—The following circumstances constitute grounds for suspension: (1) two grades of *F* any time during a probation period (part-time students who receive two grades of *F* while on probation will be suspended at the time of receipt of the second *F*); (2) four grades of *F* in any semester (or the equivalent for part-time students); (3) placement on probation for a third time; (4) a cumulative grade-point average of (a) 1.5 or below at the end of the sophomore year or upon completion of the 63rd credit in the student's

curriculum, (b) 1.9 or below at the end of the junior year or upon completion of the 97th credit in the student's curriculum, or (c) below 2.0 at any time during the senior year.

Department faculty may designate additional courses to be taken and specify grades to be received by students who fail to meet but come close to meeting the graduation requirements; suspension may be held in abeyance for a stated period in this circumstance.

Students readmitted on probation will be suspended if they do not attain a minimum GPA of 2.0 during their first semester (12 or more credit hours) or if they receive more than one grade of *F* during the period.

Once suspended, a student may not have that suspension rescinded by a grade change at a later date, although the student may apply for readmission noting the grade change. Students who have been suspended may not apply for readmission until one year after the suspension. To be considered for readmission, a student must have undertaken academic work at another institution, primarily in mathematics, science, or engineering, during the year of suspension and earned a GPA of at least 2.7. Applications for readmission are reviewed by the respective departments.

Dean's Honors and Commendation Lists—The names of all students who, in a given semester, take 12 or more graded credit hours in course work that applies to graduation requirements (or in any additional SEAS courses taken) may appear on the Dean's Honors List if a grade-point average of 3.5 is achieved or on the Dean's Commendation List if a GPA of 3.0 is achieved. No disciplinary action may have been taken against the student, and no more than one grade below *B–* and no grades below *C–* may have been earned. A student who receives a notation of *I* (Incomplete) during a semester will not be placed on the Dean's Honors or Commendation List for that semester

unless the *I* is changed to *I* followed by a letter grade within 30 days of the end of the marking period and the student continues to meet all the requirements for the Dean's Honors or Commendation List.

Incompletes—Conditions under which the notation of *I* (Incomplete) may be assigned are described under University Regulations. If the *I* is not changed to *I* followed by a letter grade within 30 days, decisions on probation, removal from probation, and suspension will be made with the information on hand, in conformance with SEAS regulations. Although the *I* may remain on the record for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The *I* cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. An *I* that is not removed after one calendar year or at the time of graduation of the student, whichever occurs first, will be changed on the permanent record to a grade of *IF*. When the *I* is changed to a letter grade, the *I* followed by the letter grade (e.g., *IB*) will appear on the student's record. The grade for which the *I* is changed will be applied to the grade report for the semester or summer session during which the change is made for the purposes of determining probation, suspension, grade-point average, and Dean's and other honor lists.

Pass/No Pass Grading System—SEAS students may not take courses required for graduation on the pass/no pass (*P/NP*) grading system. They may, however, take courses outside their regular SEAS academic program under this grading system.

Academic Work Load—A full-time undergraduate student who is not on probation may register for no more than 21 credit hours. Students on probation may not register for more than 13 credit hours. A student employed more than 24 hours a week may take no

more than 10 credit hours. In exceptional cases these limits may be exceeded with the faculty advisor's permission.

Humanities and Social Sciences Electives—With the assistance of the advisor, each student in a SEAS B.S. program chooses a set of elective courses in the humanities and social sciences. For most B.S. curricula, these normally consist of a minimum of 18 credit hours, divided equally between the humanities and social sciences. Each 9-credit group must include two courses in one subject area and a third course in a different subject area. When a foreign language is taken as part of the humanities requirement, the following rules apply: (1) the foreign language studied must not be a native language of the student, unless the courses taken are literature courses; (2) if the student has studied the language previously, he or she must first take a placement test given by the language department concerned and enroll in a course recommended by that department; and (3) the student may use at most two foreign language courses to satisfy SEAS's humanities requirements. If two courses are used, they must be in the same foreign language. The advisor must approve the program.

Since the SEAS curricula are, by necessity, oriented toward technical subjects, the humanities and social sciences electives should be courses that broaden the student's outlook. Courses in areas such as anthropology, economics, foreign languages, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

Mission Statements and Educational Objectives

Department of Civil and Environmental Engineering

Mission Statement—The mission of the Department of Civil and Environmental engineering is to provide an academic environment where professional education can be pursued, scholarly research in science and technology can be conducted, and the interest of the public can be served through the advancement of knowledge.

In pursuit of this mission the administration, faculty, and staff join to provide a broad based, rigorous professional education in civil engineering at the undergraduate level, provide graduate education at the master's level in major areas of civil engineering, provide doctoral programs in selective areas of excellence within civil engineering, and serve the local community, citizens of the nation, and the people of the world.

Educational Objectives—The civil engineering undergraduate program of study prepares its graduates with the following career and professional accomplishments.

Technical knowledge: students are enabled to use their technical knowledge and expertise in mathematics, science, and engineering to identify, formulate, and solve problems involving design, experimentation, and analysis of a wide variety of civil engineering applications.

Team skills: students develop leadership skills, demonstrate proficiency in all forms of communication, and perform well in a multidisciplinary team environment. Continuous

education: students recognize the need for continuing their education through graduate

studies, continuous education opportunities, and/or self-education. Professionalism: students are prepared to exercise the highest standards of personal and professional integrity,

demonstrate an understanding of the ethical and professional issues related to the

procurement of work, and provide coordination between the design and construction aspects of the civil engineering profession.

These objectives are accomplished through a rigorous curriculum that emphasizes fundamentals in basic sciences, mathematics, humanities, and engineering in five major areas of civil engineering: environmental engineering, geotechnical engineering, structural engineering, water resources engineering, and transportation engineering. The curriculum enables students to use modern engineering tools to work both individually and in teams. The curriculum contains a well-structured set of courses that enable students to develop the required analytical, experimental, and design skills.

Educational Outcomes—The civil engineering undergraduate program of study prepares its graduates with the following career and professional accomplishments: an ability to apply knowledge of mathematics, science, and engineering; design and conduct experiments and analyze and interpret data; design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, health and safety, manufacturability, and sustainability constraints; identify, formulate, and solve engineering problems; use the techniques, skills, and modern engineering tools necessary for engineering practice; function on multidisciplinary teams; and communicate effectively. Students are provided with the broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and social context; a knowledge of contemporary issues; an understanding of professional and ethical responsibility; and a recognition of the need for and ability to engage in lifelong learning.

The civil engineering undergraduate program curriculum includes coverage of proficiency in mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry; proficiency in a minimum of four recognized major civil engineering areas; the ability to conduct laboratory experiments and

to critically analyze and interpret data in more than one of the recognized major civil engineering areas; the ability to perform civil engineering design by means of design experiences integrated throughout the professional component of the curriculum; and an understanding of professional practice issues such as procurement of work, bidding versus quality-based selection processes, how the design professionals and the construction professions interact to construct a project, the importance of professional licensure and continuing education, and/or other professional practice issues.

Department of Computer Science

Mission Statement—The mission of the Department of Computer Science is to serve the global community by providing high-quality computer science education, research, and professional service and to advance computer technology in areas of selective excellence.

Educational Objectives—The program has been developed to prepare graduates who, in the years following graduation, will earn an advanced degree in computer science or related disciplines or a professional degree (such as law, business, medicine), or be gainfully employed in the computer or IT industry with the ability to apply skills and knowledge learned while an undergraduate at GW, and who will conduct themselves professionally and ethically, work effectively in teams, and communicate effectively to both technical and non-technical audiences.

Educational Outcomes—By the time of graduation, a computer science student will have: (1) learned to apply principles from the fundamentals of computer science, including discrete structures, data structures, algorithms, and the theory of computing; (2) acquired an understanding of the hardware and software architecture of computer systems, including architecture, operating systems, databases, languages, and networks; (3) participated

effectively in team projects and team activities, and acquired an understanding of: (a) the overall social and professional context in which computing activities take place; (b) the global and local impact of computing; and (c) professional, ethical, legal, security, and social issues and responsibilities; (4) demonstrated an application of software engineering principles through completion of a challenging capstone project requiring specification, design, and implementation; and (5) conveyed technical knowledge in an effective manner through written and oral communications.

Department of Electrical and Computer Engineering

Mission Statement—The mission of the Department of Electrical and Computer Engineering is to motivate and inspire our students by providing high-caliber, fully integrated programs in electrical, computer, and biomedical engineering in order to provide leadership in a rapidly evolving global information society in the service of humanity and to advance the state of knowledge in our disciplines by actively pursuing scholarly research for publication and dissemination.

Educational Objectives—The objectives of the programs are to educate students in the principles of engineering, including cognizance of their responsibilities as members of society. The engineering education is based on the sciences and the principles of design. Social responsibilities are instilled through a balanced program in the humanities and social sciences as well as coverage of specific topics in professional ethics and social responsibilities. The programs provide students with a solid foundation in electrical, computer, and biomedical engineering through a balanced curriculum integrating the underlying scientific and mathematical knowledge with the latest technological developments. The curriculum is designed to produce engineers capable of functioning in

the present technological environment and of adapting to future directions of the profession. Specifically, the programs aim to teach students how to analyze and implement complex interdisciplinary engineering projects; to give students a strong foundation for graduate studies in their field; to prepare students for competitive and challenging industrial applications; to teach students how to use state-of-the-art computer tools for solving engineering problems; to expose students to hands-on engineering experience through laboratory courses; to cultivate students' abilities to communicate and work effectively in teams; and to help students develop an understanding of the ethical issues and global perspectives arising in the practice of the engineering profession.

Department of Engineering Management and Systems Engineering

Mission Statement—The mission of the Department of Engineering Management and Systems Engineering is to deliver an integrated program of research, teaching, and public service to the technology community. The Department develops creative leadership to bridge dynamic, complex technologies and societal needs. This includes delivering instruction in the management of technology and in systems engineering, operations research, and allied fields to undergraduate and graduate students who are preparing to assume leadership roles as technology professionals. Our education programs provide an understanding of the managerial role, analysis of the diverse functions of technology-based organizations, and instruction in modern management and mathematical analysis and modeling tools as they apply to formulating and executing decisions in engineering and scientific organizations. Our research programs feature research in the management of technology; fundamental and applied research in systems engineering and operations research, with a particularly strong interest in stochastic analysis and system optimization;

sponsorship from government, industry, and the technology community; and a strong presence in refereed professional journals and leadership in professional societies.

Educational Objectives—The systems engineering undergraduate program of study prepares its graduates for work as systems engineers in a variety of professional fields and for continuing study at the graduate level. The educational objectives include conveying the expectations of an ethical and professional work environment, so that graduates will be prepared to fully engage with both technical and non-technical colleagues.

Educational Outcomes—By the time of graduation, a systems engineering student will have (1) learned to apply the fundamentals of systems engineering, including needs elicitation, requirements elaboration, design option analyses, architectural trade studies, system traceability methods, configuration baseline and management, and engineering change process; (2) acquired an understanding of complexity in large systems development and operations; (3) developed communications skills appropriate to the conveyance of complex systems information to a variety of audiences; (4) participated effectively in team-based projects; and (5) demonstrated the application of systems engineering skills through the development and completion of a large capstone project.

Department of Mechanical and Aerospace Engineering

Mission Statement—The mission of the Department of Mechanical and Aerospace Engineering is to educate students to become professional mechanical and aerospace engineers who are confident in their understanding of science and technology, who are creative in the face of new challenges, and whose analytical skill and thirst for lifelong learning will open new career horizons; to contribute to society through the conduct of relevant research at the forefront of mechanical and aerospace engineering knowledge and

to provide opportunities for students to participate and learn through mentorship with the faculty; and to serve the nation, the community, and the university.

Educational Objectives—The mechanical engineering program provides an integrated curriculum aimed at producing graduates who develop successful careers in mechanical engineering practice or in science and technology. Graduates will be prepared to accomplish the following within a few years after graduation: (1) practice mechanical engineering in industry or government, applying knowledge and skills acquired in the program to the design of engineering systems and devices and the analysis and solution of engineering problems of complex scope; and/or (2) be successful in advanced education, research and development, or other creative efforts in engineering, science, and technology; and/or (3) apply engineering skills while pursuing careers in other professions, such as law, medicine, business, or public policy (this objective is included to reflect the program's patent law and medical preparation options and will apply to a selected group of graduates of the program); (4) conduct themselves in a responsible and ethical manner, cognizant of the social, environmental, and economic impact of engineering and technology on society; (5) embark upon a process of lifelong learning in their profession; and (6) enter into leadership roles in technological development or local, national, or global economic development.

Bachelor of Science Degree Programs

Check with the department concerned for total credit requirements for the degree programs that follow.

The listed curriculums on the following pages all assume electives to be at least 3 credit hours. Credit toward the degree is not allowed for LSPA courses. The key to abbreviations for course designations can be found at the beginning of the Courses of Instruction section.

Biomedical Engineering

Offered by the Department of Electrical and Computer Engineering, this innovative program provides a strong foundation in the basic sciences as well as the theory and practice of biomedical engineering. In consultation with their faculty advisor, students choose an area of specialization from topics including biomechanics, instrumentation, and medical preparation. Distinguishing features of the program are its specialty laboratories, summer internships in metropolitan-area private or federal laboratories, and a capstone design sequence.

First Semester—UW 1020; SEAS 1001; ECE 1010; BiSc 1111; Chem 1111; Math 1231.

Second Semester—BiSc 1112; ECE 1020; Chem 1112; Math 1232; Phys 1021.

Third Semester—ApSc 2113; ECE 2110, 2810; Math 2233; Phys 1022.

Fourth Semester—CSci 1121; ECE 2115, 2140, 2210, 2815; humanities or social sciences elective.

Fifth Semester—CSci 1132; ECE 3220, 3910, 3820, two technical electives.

Sixth Semester—ApSc 3115; ECE 3915, 4820; two humanities or social sciences electives; technical elective.

Seventh Semester—ECE 4920; MAE 4168; Phys 2127; humanities or social sciences elective; technical elective.

Eighth Semester—ECE 4925, 4825; Phys 2128; Phil 2135; humanities or social sciences elective; technical elective.

All technical electives must be approved by the academic advisor. More information can be found at www.ece.gwu.edu.

Civil Engineering

Civil engineering encompasses those branches of engineering most closely related to the control and improvement of our environment and of the physical conditions of life. Civil engineers apply many technical specialties in order to plan, design, and construct projects that range from buildings and transportation systems to space stations and space habitats.

First Semester—UW 1020; SEAS 1001; CE 1010; Math 1231; Chem 1111; humanities or social sciences elective.

Second Semester—CSci 1041; MAE 1004; Math 1232; Phys 1021; humanities or social sciences elective.

Third Semester—ApSc 2057, 2113; Math 2233; Phys 1022; humanities or social sciences elective.

Fourth Semester—ApSc 2058; CE 2210, 2220, 2710; Geol 1001; humanities or social sciences elective.

Fifth Semester—ApSc 3115; CE 3230, 3110, 3111, 3720; MAE 3126; humanities or social sciences elective.

Sixth Semester—CE 3240, 3611, 3521, 3310, 3610, 3520; humanities or social sciences elective.

Seventh Semester—CE 4410, 4411, 4320, 4620, 4530; technical elective selected from list below.

Eighth Semester—CE 4330, 4340, 6403; technical elective; design elective.

Technical Electives—CE 4810, 4820, 6201, 6301, 6302, 6202, 6320, 6401, 6402, 6405, 6503, 6504, 6505, 6601, 6602, 6603, 6604, 6605, 6608, 6609, 6721, 6722, 6800; EMSE 6410.

Design Electives—CE 6201, 6301, 6320, 6502, 6602, 6603, 6706.

The Department of Civil and Environmental Engineering also offers the Bachelor of Science major in civil engineering with the options listed below. Additional information on the options can be found at www.cee.seas.gwu.edu.

Environmental Engineering Option in Civil Engineering—The environmental engineering option leads to a bachelor's degree in civil engineering. Students are prepared to work in technical environmental fields such as water and wastewater treatment, hazardous waste treatment, and environmental impact assessment. Students are also prepared to pursue graduate study in environmental engineering.

Sustainability Option in Civil Engineering—The sustainability option leads to a bachelor's degree in civil engineering. Students are prepared to work in sustainable development—the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development.

Transportation Engineering Option in Civil Engineering—The transportation engineering option leads to a bachelor's degree in civil engineering. Transportation engineers design, construct, maintain, and upgrade transportation facilities, including highways, railroads, airfields, and ports. The program emphasizes automotive, highway, and multi-modal transportation safety and security.

Medical Preparation Option in Civil Engineering—The medical preparation option leads to a bachelor's degree in civil engineering and prepares the student for application to

medical school. The student is also prepared to work in research and development or to pursue graduate study in the fields of biomechanics and biotechnology.

Computer Engineering

Computer engineering combines electronic design, computer architecture, programming of computing systems, computer networks, and applied mathematics. Students in the program are prepared in the theory and application of hardware and software design, computer networks, embedded systems, and very large scale integrated (VLSI) circuit design and applications. Students can take electives in advanced topics, such as optical networks, broadband wireless networks, and technologies for the next generation of information systems.

First Semester—UW 1020; ECE 1010; Chem 1111; Math 1231; SEAS 1001; elective.

Second Semester—CSci 1121, 1311; ECE 1020; Math 1232; Phys 1021; elective.

Third Semester—ApSc 2113; CSci 1132; ECE 2110; Math 2233; Phys 1022.

Fourth Semester—ApSc 3115; ECE 2115, 2210, 2140; elective.

Fifth Semester—CSci 3411; ECE 3220, 3130, 3520, 3910, 3135.

Sixth Semester—ECE 3310, 3415, 3425, 3915, 3525, 3515; elective.

Seventh Semester—ECE 4140, 4920, 4535; two electives.

Eighth Semester—ECE 4150, 4925; Phil 2135; two electives.

The eight electives must include three 3-credit courses in the social sciences, two 3-credit courses in the humanities, and three 3-credit technical courses. Technical electives may be chosen with the approval of the advisor from advanced undergraduate or graduate courses in engineering, computer science, mathematics, physical sciences, or biological sciences. More information can be found at www.ece.gwu.edu.

Computer Science

The program combines software development, computer systems and architecture, algorithms, project design, science, and mathematics to provide a strong background in the foundations that underlie computer science. Students are prepared to design and implement software needed for Internet operations, computer graphics and animation, secure systems, and applications for small, large, and embedded systems. In consultation with the advisor, students choose a technical track and a non-technical track. The technical track provides depth in a particular area of computer science, and the non-technical track is intended to enable the student to stay current with our rapidly evolving field and to establish the relevance of their studies in our global and changing environment.

First Semester—UW 1020; CSci 1010, 1111; SEAS 1001; math requirement; humanities or social sciences elective.

Second Semester—CSci 1311, 1112; math requirement; science requirement; humanities or social sciences elective.

Third Semester—CSci 2312, 2461, 2113; science requirement; humanities or social sciences elective.

Fourth Semester—CSci 3410, 2441; computer science elective; science requirement; statistics requirement (CSci 3362 or ApSc 3115 or Stat 1051 or 1053).

Fifth Semester—CSci 3313, 3212, 3411; humanities or social sciences elective.

Sixth Semester—technical track elective; non-technical track elective; math or science elective; humanities or social sciences elective; unrestricted elective.

Seventh Semester—CSci 4243; technical track elective; non-technical track elective; humanities or social sciences elective; unrestricted elective.

Eighth Semester—CSci 4244; technical track elective; non-technical track elective; unrestricted electives (6 hours).

Mathematics requirements can be met by taking Math 1220–21 and 1232 or by taking Math 1231 and 1232. All students must take two math courses not counting Math 1220; students who take Math 1220 must take it as one of their unrestricted electives. Science requirements can be met by choosing from BiSc 1111–12, Chem 1111–12, and Phys 1021–22. The three science requirement courses must include a two-course sequence.

Some examples of technical tracks include computer security and information assurance, digital media, foundations and theory, biomedical computing, systems, software engineering and applications and research. Examples of non-technical tracks include business, project management, global engineering, pre-law, and environment and climate change. Students may define their own non-technical track in consultation with their advisor. More information on the tracks and track requirements can be found at www.cs.gwu.edu.

Medical Preparation Option in Computer Science—This option is for students interested in pursuing a computer science major with preparation for application to a medical school by combining additional natural science course work with computer science course requirements.

Electrical Engineering

Electrical engineers design the enabling technology for modern telecommunications networks, including the Internet, biomedical instrumentation, and electromagnetic applications. The program focuses on signal processing; communication theory and practice; voice, data, video and multimedia communication networks; very large scale

integrated (VLSI) circuit design and applications; and control systems. Students can take electives in advanced topics, such as optical networks, broadband wireless networks, and technologies for the next generation of information systems.

First Semester—UW 1020; Chem 1111; Math 1231; SEAS 1001; ECE 1010; elective.

Second Semester—CSci 1121; ECE 1020; Math 1232; Phys 1021; two electives.

Third Semester—ApSc 2113; CSci 1132; ECE 2110; Math 2233; Phys 1022.

Fourth Semester—ApSc 2114; ECE 2115, 2210, 2140; elective.

Fifth Semester—ApSc 3115; ECE 3220, 3130, 3520, 3910, 3135.

Sixth Semester—ECE 3315, 3125, 3410, 3915; elective.

Seventh Semester—ECE 4320, 4140, 4920, 4710; two electives.

Eighth Semester—ECE 4925, 4610; Phil 2135; three electives.

The ten electives must include three 3-credit courses in the social sciences, two 3-credit courses in the humanities, and five 3-credit technical courses. Technical electives may be chosen with the approval of the advisor from advanced undergraduate or graduate courses in engineering, computer science, mathematics, physical sciences, or biological sciences.

The Department of Electrical and Computer Engineering also offers the Bachelor of Science major in electrical engineering with the options listed below. More information can be found at www.ece.gwu.edu.

Energy Option in Electrical Engineering—The energy option leads to a bachelor's degree in electrical engineering and prepares the student to work in technical energy fields such as electric utility companies and in research into improved methods of generation, transmission, and distribution of electrical energy.

Medical Preparation Option in Electrical Engineering—The medical preparation option leads to a bachelor's degree in electrical engineering and prepares the student for application to medical school. The student is also prepared to work in various health sciences fields, to conduct research toward development of electronic equipment to assist in diagnosing and treating disease, or to continue as a graduate student in engineering with exceptional qualifications for biomedical engineering.

Mechanical Engineering

Mechanical engineering encompasses a vast range of industrial activities. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of complex systems. Applications include aerospace, energy conversion, computer-aided design and manufacturing, power and propulsion systems, robotics, and control systems.

First Semester—UW 1020; SEAS 1001; MAE 1001; Math 1231; Chem 1111; humanities or social sciences elective.

Second Semester—CSci 1121; MAE 1004; Math 1232, 2184; Phys 1021.

Third Semester—ApSc 2057, 2113; Math 2233; Phys 1022; humanities or social sciences elective.

Fourth Semester—ApSc 2058; ECE 2110; MAE 2117, 2131; humanities or social sciences elective.

Fifth Semester—CE 2220; MAE 3126, 3166, 3167, 3190, 3192.

Sixth Semester—ApSc 3115; MAE 3120, 3134, 3187, 3191; humanities or social sciences elective.

Seventh Semester—MAE 4149, 4182, 4193; technical electives (6 hours); humanities or social sciences elective.

Eighth Semester—MAE 4152; technical electives (9 hours); humanities or social sciences elective.

Humanities and social sciences electives must include Phil 2135 Ethics in Business and the Professions. Technical electives are chosen from MAE courses in the 3000, 4000, and 6000 series, excluding MAE 3171, 4172, 6298, and 6998–99. All technical electives must be approved by the undergraduate advisor. On a case-by-case basis, technical electives may be chosen from other departments if approved by both the undergraduate advisor and the department chair.

The Department of Mechanical and Aerospace Engineering also offers the Bachelor of Science major in mechanical engineering with the options listed below. More information on the options can be found at www.mae.seas.gwu.edu.

Aerospace Option in Mechanical Engineering—The aerospace engineering option leads to a bachelor's degree in mechanical engineering while preparing the student to work in the aerospace industry or to pursue graduate study in aerospace engineering. It provides a strong foundation in aerodynamics, airplane performance, propulsion, aerospace structures, orbital mechanics, spacecraft dynamics, and aircraft and spacecraft design.

Biomechanical Engineering Option in Mechanical Engineering—The biomechanical engineering option leads to a bachelor's degree in mechanical engineering while preparing the student to work in the biomedical industry or to pursue graduate study in biomedical engineering. It provides a strong foundation in human anatomy and physiology, biomechanics, biomaterials, and design of biomedical devices.

Medical Preparation Option in Mechanical Engineering—The medical preparation option leads to a bachelor's degree in mechanical engineering and prepares the student for

application to medical school. The student is also prepared to work in research and development or to pursue graduate study in the fields of biomechanics and biotechnology.

Patent Law Option in Mechanical Engineering—The patent law option in mechanical engineering leads to a bachelor's degree in mechanical engineering while providing a strong foundation in fundamental principles of patent law and the influences of the U.S. patent system on modern engineering design. A student in this option obtains background that can lead to work as a technical specialist in a patent law firm or in the patent department of an industrial employer. The option also provides excellent preparation for pursuit of a subsequent J.D. that may focus on intellectual property law.

Robotics Option in Mechanical Engineering—The robotics engineering option leads to a bachelor's degree in mechanical engineering while preparing the student to work in the robotics industry or to pursue graduate study in robotics engineering. It provides a strong foundation in robotic mechanisms design, analysis, and integration; kinematics, dynamics, and control of robots; mechatronics design; sensing, actuation, and measurement; microprocessors for robotic systems; robotic haptics; and topics on artificial intelligence.

Systems Engineering

The multidisciplinary field of systems engineering applies engineering techniques and mathematical methods to improve planning and decision making in organizational systems composed of people, machines, and procedures. By observing, understanding, modeling, and predicting the behavior of such systems, practitioners of systems engineering assist the decision-making process that seeks to design and operate the systems optimally. Systems engineering finds application in many areas, including communications, energy,

environment, finance, health care, information technology, marketing, national defense, project management, software development, and transportation.

Each student must participate in an appropriate internship/co-op experience during the last two years of the program. This requirement may be satisfied by an approved full-time summer position after the second or third year or by one or two approved part-time positions requiring 15–20 hours per week during two of the final four semesters. A position obtained through the GW Co-op Office will usually be acceptable; the position may be either paid or unpaid.

The systems engineering program is designed to provide the student a broad and solid education in the basics of mathematical modeling, software and information systems, and the treatment of uncertainty. Analytical thinking is stressed in order to prepare the student for graduate education or productive professional employment. The program is planned to develop the student's communication skills and awareness of the current professional world.

First Semester—UW 1020; CSci 1111; EMSE 1001; SEAS 1001; Math 1231; science elective.

Second Semester—CSci 1112; Econ 1011; Math 1232; science elective; humanities or social sciences elective.

Third Semester—ApSc 2113; Comm 1040, 1041, or 1042; CSci 2113; Math 2233; science elective.

Fourth Semester—ApSc 3115; CSci 2441; EMSE 2705, 2801; humanities or social sciences elective.

Fifth Semester—EMSE 3850, 3740, 3815, 4755; humanities or social sciences elective, technical elective.

Sixth Semester—EMSE 3770, 3820, 3855, 4410; technical elective; humanities or social sciences elective.

Seventh Semester—EMSE 3760, 4190, 4710; Stat 2118; technical elective.

Eighth Semester—EMSE 4190, 4191; Stat 2183; three technical electives.

Science requirements can be met by choosing from BiSc 1111–12, Chem 1111–12, and Phys 1021–22. The three science requirement courses must include a two-course sequence.

Technical Electives—Each systems engineering major will gain specific expertise in a chosen technical area by taking a six-course sequence leading to a minor or secondary field from another department of the University. Technical electives are selected with the approval of the student's academic advisor. Areas frequently chosen are computer science, economics, finance, management, mathematics, naval science, statistics, and specific fields of engineering; consult the advisor for other approved areas and their requirements.

Medical Preparation Option in Systems Engineering—The medical preparation option leads to a bachelor's degree in systems engineering and quantitatively prepares students for medical careers through a program that emphasizes decision modeling. Decision modeling is increasingly applicable to the medical field because of the growing use of computers and information systems in medicine and the interplay of diagnosis, treatment, and economics.

Bachelor of Arts Degree Programs

The School of Engineering and Applied Science offers a Bachelor of Arts degree, with majors in applied science and technology and in computer science. Each program provides a

strong and level base for students who intend to make their careers in fields allied to science and technology or to computer science.

Applied Science and Technology

The Bachelor of Arts major in applied science and technology is a broad-based engineering-oriented program, with a breadth of liberal arts, for students who intend to make their careers in fields allied to science and technology and/or continue their education toward professional careers in law, medicine, business, teaching, or the media. It is designed to help students pursue their goals in a world that relies more and more upon science and technology.

First Semester—UW 1020, EMSE 1001, SEAS 1001, Chem 1111, Math 1231, humanities or social sciences elective.

Second Semester—CSci 1121 or 1111, Chem 1112, Math 1232, humanities or social sciences elective, arts elective.

Third Semester—CSci 1132 or 1112, Phys 1011 or 1021, literature elective, two unrestricted electives.

Fourth Semester—ApSc 3115, EMSE 4410, Phys 1012 or 1022, literature elective, unrestricted elective.

Fifth Semester—BiSc 1111, EMSE 3850, Comm 1040 or 1041 or 1042, MAE 1004, allied minor elective.

Sixth Semester—BiSc 1112, ISTM 4121, two allied minor electives, humanities or social sciences elective.

Seventh Semester—MAE 3192; EMSE 3740, 6005; allied minor elective, SEAS elective.

Eighth Semester—CE 4330, allied minor elective, humanities or social sciences elective, three unrestricted electives.

Electives—Electives in specified categories are chosen from lists of courses available from the advisor. Allied minor electives are selected, with the approval of the advisor, to form a coherent and meaningful program of 15 credit hours. Popular selections include biology, communication, computer science, design, economics, engineering, environmental studies, finance, international business, management, mathematics, medical preparation, psychology, statistics, and operations research.

Computer Science

The Bachelor of Arts major in computer science provides a broad-based liberal arts curriculum for students who wish to augment technical knowledge with humanities, social sciences, business, communication, or management skills. Foundation courses focus on mathematics, science, software design and programming, computer systems and architecture, and algorithm design. Additional breadth or depth is afforded by selection of technical track courses that build on the foundations to provide in-depth exposure to a specific field in computer science. The program is designed for those with interests in two or more disciplines; students complete a second major or two minors in another academic department.

First Semester—UW 1020, CSci 1010, 1111; SEAS 1001; math requirement; social and behavioral sciences elective.

Second Semester—CSci 1311, 1112; math requirement; science requirement; social and behavioral sciences elective.

Third Semester—CSci 2461, 2113; science requirement; statistics requirement (ApSc 3115 or Stat 1051 or 1053); humanities elective.

Fourth Semester—CSci 2441; science requirement; humanities elective; second major elective; unrestricted elective.

Fifth Semester—Computer science restricted elective; creative arts elective; second major electives (9 hours).

Sixth Semester—Technical track elective; humanities elective; foreign languages and culture elective; second major electives (6 hours).

Seventh Semester—Computer science restricted elective; technical track elective; foreign languages and culture elective; second major electives (6 hours).

Eighth Semester—Technical track elective; humanities elective; unrestricted elective; second major electives (6 hours).

Students in this program complete a second major or two minors in another department outside engineering. Course requirements include UW 1020, Math 1220–21 or 1231–32; CSci 1010, 1111, 1311, 1112, 2461, 2113, 2441; two restricted electives chosen from CSci 3313, 3212, 3410, 3411, 4223; three courses from a technical track in computer science (see the department for requirements); general curriculum requirement courses chosen from specified lists available from the advisor and from the department website in social or behavioral sciences, humanities, foreign languages and cultures, and creative and performing arts. Students are expected to undertake a significant project by completing either CSci 4243–44 or a project or senior thesis in their second major.

The minimum number of credits required for the major in computer science is 120; the credit total depends on the second major or minors chosen by the student. Students

interested in pursuing a computer science major with preparation for application to medical school can also choose the medical preparation option. Additional information about the Bachelor of Arts major in computer science is available at www.cs.gwu.edu/academics.

Special Programs

Combined Degree Programs

Combined degree programs available to SEAS students include the B.S. and M.S. in civil engineering, mechanical engineering, and systems engineering; the B.A. or B.S. and M.S. in computer science or in cybersecurity in computer science; the B.S. in biomedical engineering, computer engineering, or electrical engineering and M.S. in biomedical engineering, computer engineering, or electrical engineering; and the B.S. in computer engineering, computer science, electrical engineering, or systems engineering and M.S. in engineering management. Also available is the B.A. in applied science and technology or computer science in SEAS and M.Ed. in secondary education (with a specialization in computer science, science, or mathematics) in the Graduate School of Education and Human Development. Specific information is available from the departments concerned.

Integrated Engineering and Law Program

The integrated engineering and law program provides an opportunity for very highly qualified entering students to complete a B.S. or B.A. degree in a SEAS field and then a J.D. degree, by assuring admission to the GW Law School's J.D. program for students who meet stated conditions. Detailed information on this program is available from the Office of Undergraduate Admissions.

Minors and Secondary Fields of Study

The SEAS Departments of Computer Science, Electrical and Computer Engineering, Engineering Management and Systems Engineering, and Mechanical and Aerospace Engineering offer minors that are available to SEAS undergraduates whose major is not offered by that department. Depending on the student's major, additional credit hours beyond the minimum required for the major may be necessary to complete the minor. Consult the advisor and the departments concerned.

The School offers secondary fields of study in biomedical engineering, computer engineering, computer science, electrical engineering, engineering analysis, and operations research to students in other schools of the University. SEAS students are cautioned to consult their advisor and department chair before enrolling in a secondary field of study in another school of the University.

Concentration in General Business

The GW School of Business offers a concentration in general business for well-qualified SEAS undergraduates. Depending on the student's major, additional credit hours beyond the minimum required for the major may be necessary in order to complete this concentration; students should consult their advisor before requesting to add the concentration to their program or beginning to fulfill its requirements.

Double Majors

Students who complete the requirements for two majors in SEAS may graduate with a double major, provided the two majors are in different departments. Consult advisors in the two departments and declare both majors on the appropriate form in the SEAS Office of Student Services, Advising, and Records.

SEAS students may also pursue a second major in Columbian College of Arts and Sciences or the Elliott School of International Affairs, and Columbian College and Elliott School students may pursue a second major in SEAS, provided that permission has been obtained from the appropriate administrative office of each of the two schools.

The degree is earned from the home school, and students must complete the major in their own school in order to graduate.

In all cases, double majors do not result in two degrees. See Double Majors and Double Degrees under University Regulations.

3:2 Dual-Degree Programs

The School of Engineering and Applied Science has developed 3:2 dual-degree programs in liberal arts and engineering with the following institutions: Bowie State University, Gallaudet University, Hood College, Bridgewater College, St. Thomas Aquinas College, and Trinity University. Students enroll initially at one of the above institutions and pursue a three-year course of studies covering social sciences, humanities, mathematics, physics, and chemistry. They then follow a two-year program at SEAS in any of the areas of engineering or computer science offered in the School's regular four-year programs. Upon successful completion of the two-year program at GW, students are awarded two baccalaureates: a B.S. or B.A. from the first institution and a B.S. or B.A. from GW. For further information on the 3:2 dual-degree programs, contact the admissions offices of the institutions listed above.

ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

Dean M.E. Brown

Associate Deans H. Agnew, M. Mochizuki, D. Shaw

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for understanding and working in an increasingly globalized world. The historical roots of the Elliott School extend back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott. Lloyd Elliott was the President of The George Washington University from 1965 to 1988.

The Degree of Bachelor of Arts

The Elliott School offers programs leading to the degree of Bachelor of Arts with majors in international affairs, Asian studies, Latin American and hemispheric studies, and Middle East studies. These programs provide a broad liberal arts education and depth in historical and contemporary issues in international affairs. The programs are interdisciplinary and multidisciplinary, combining courses offered through the School with courses offered by other schools and departments of the University.

Residence

Students must complete at least 60 credit hours in residence. In addition to requirements listed under University Regulations, students wishing to transfer from another division of the University into a degree program in the Elliott School must have completed 24 credits at GW with a cumulative grade-point average of 3.0 or above at the time of transfer. Except in well-documented extenuating circumstances, at least 9 of the final 15 hours must be completed in residence.

Academic Standing

In order to graduate, a student must complete 120 credit hours with a cumulative grade-point average of 2.0. Courses in lifestyle, sport, and physical activity are not counted toward the degree

Semester Warning—A student whose cumulative grade-point average is less than 2.0 after attempting a minimum of 12 credit hours is placed on semester warning at the end of the semester and is required to take corrective measures, including limitation of course load to no more than 13 credit hours. A student on semester warning will be placed on probation if, after attempting an additional 12 credits, the cumulative GPA remains below 2.0. For part-time students and those enrolled in the summer, a semester is interpreted to mean a time interval in which at least 12 credits have been attempted.

Probation—A student whose cumulative grade-point average is less than 2.0 but at least 1.0 any time after having attempted a minimum of 24 credit hours is placed on probation. A student will be continued on probation if, after the initial semester on probation, the cumulative GPA remains below 2.0 but is above 1.0. For part-time students and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 12 credit hours have been attempted. A student on probation is limited to no more than 13 credit hours of course work per semester. A student is returned to good standing if the cumulative GPA is at least 2.0 after completion of at least 12 additional credits.

Suspension—Failure to resume or reach a cumulative grade-point average of 2.0 after two successive semesters on probation results in suspension. A student whose cumulative grade-point average falls below 1.0 any time after having enrolled in a minimum of 24

credit hours as a student in the Elliott School will be suspended. Students who are suspended for poor scholarship may apply for readmission after the lapse of one fall or spring semester. To be considered for readmission, the student must submit evidence to the Dean's Council of conduct during absence from the University which indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

Dean's Honor List—The name of every student who attains a 3.75 grade-point average in course work is placed on the Dean's Honor List for that semester. Appearance on the list is limited to full-time students registered for a minimum of 15 credit hours with letter grades in a given semester and to part-time students registered for a minimum of 15 credit hours with letter grades over a period of two consecutive semesters, which may include a summer term.

Timely Progress Toward the Degree—Students who fail to make adequate and timely progress toward the degree, through repeated leaves or repeated failure to complete an appropriate number of credits per semester, may be dismissed from the University (see Right to Dismiss Students under University Regulations). Students dismissed on these grounds may apply for readmission after supplying sufficient evidence of academic promise.

Special Honors—In addition to the general requirements stated under University Regulations, a candidate for Special Honors in an Elliott School major must have attained a 3.7 grade-point average overall and complete with an A– or above either an Elliott School or Honors senior seminar, or an Elliott School or Honors senior thesis. Students must apply

for honors candidacy by the beginning of the senior year through the Office of Academic Advising and Student Services.

Curriculum Requirements for the First Two Years

Curriculum requirements for Elliott School students in the freshman and sophomore years are listed below. Consult gwu.edu/~elliott/academics/ugrad before choosing courses to fulfill these requirements. Information on earning credit by examination or waiving curriculum requirements is available from academic advisors in the Elliott School.

As a basis for all Elliott School B.A. programs, students take IAff 1005, Econ 1011–12, PSc 1001, Hist 1011, and Anth 1002 or Geog 1001. In addition, all students take (1) UW 1020; (2) 3 credits of math courses; (3) 3–4 credits of science courses; (4) 9 credits of humanities or 6 credits of humanities and 3 credits of creative arts courses.

Requirements for the Majors

For the four Elliott School majors, lists of designated courses that fulfill major requirements are found at elliott.gwu.edu/academics/ugrad. With approval of the advisor or program director, pertinent Special Topics or other courses may be taken in place of those listed.

International Affairs—Required courses for the major: Econ 2180 or 2181–82; one upper-division course selected from designated lists for each of the following: research methods (from Anth, Econ, Geog, PSc, Psyc, Soc, Stat); international or comparative politics (from PSc or IAff); historical analysis of U.S. foreign policy (from Hist); an Anth or Geog course. All international affairs majors must demonstrate third-year proficiency in an appropriate modern foreign language by course work or examination.

Each student must take two regional foundational courses covering different regions and 15 credit hours of additional course work in either a functional or regional

concentration. The functional concentrations are international politics; international economics; comparative political, economic, and social systems; international development; contemporary cultures and societies; conflict resolution; security policy; global public health; international environmental studies. The regional concentrations are Africa, Asia, Europe and Eurasia, Latin America, Middle East.

Asian Studies—Required courses for the major: IAff 2091; Econ 2151, 2169, or 2170; three courses selected from a list of approved history and culture courses; two approved courses selected from PSc 2369 through 2475 and Geog 3165; one course in Asian literature; and three upper-division Asia-related courses, selected in consultation with the program director. The program must include a research methods course and a regional foundation course on a region other than the student's major. Completion of third-year-level language study in an approved Asian language is required.

Latin American and Hemispheric Studies—Required courses for the major: IAff 2090; Econ 2185; PSc 2383 or 2484; Geog 3161; Hist 3710 or 3711; Anth 3702, 3812, or 3814; one approved course in Spanish-American literature. Four additional upper-division courses dealing with Latin American and Hemispheric studies and selected in consultation with the program director; two of these courses are selected from international affairs, and two from anthropology, art history, economics, geography, history, political science, and Hispanic literatures. The program must include a research methods course and a regional foundation course on a region other than the student's major. Completion of third-year-level language study in Spanish (Span 2006) or another approved foreign language is required.

Middle East Studies—Required courses for the major: IAff 2040 (Middle East) as a foundation course; two courses selected from Hist 2803, 2804, 3060, 3801, 3810, 3811; two courses selected from PSc 2476, 2377, 2478, 2379; two courses selected from Rel 1009, 3211, 3231, 3401, 3414, 3475, 3431, 3481; a course selected from Econ 2136, 2151, 2180, 2181–82; a literature course selected from Arab 4001, 4002; Clas 3101, 3102, 3201; or Hebr 4001–2; and two additional courses related to the Middle East from any discipline, selected in consultation with the program director. The program must include a research methods course and a regional foundation course on a region other than the student's major. Completion of third-year–level language study in Arabic (Arab 3301 or 3302), Hebrew (Hebr 3301 or 3302), or Persian (Pers 3002) is required.

General Elliott School Policies

Scholarship Performance in the Major—All courses indicated as Requirements for the Majors (see above), including third-year language proficiency, must be completed with grades no lower than *C*–. If a student receives a grade of *D*+, *D*, or *D*– in any of these courses, the credit will count toward the degree, but the student must either repeat the course or, with approval of the academic advisor, substitute another course, in either case with a grade no lower than *C*–. If the student must repeat the course, credit for the repetition does not count toward the degree, and grades for both the initial course and the repeated course are used to compute the GPA. If the Office of Academic Advising allows another course to be substituted, the initial course is considered to be an elective. The student is expected to consult the Office of Academic Advising in all matters affecting the program of study, such as changes, substitutions, withdrawals, or transfer of credit from other institutions.

Incompletes—Conditions under which the symbol *I* (Incomplete) may be assigned are described under University Regulations. Incomplete course work must be completed no later than one calendar year from the last day of the examination period of the semester or summer session in which the indication of *I* was assigned. When work for the course is complete, the grade earned will be indicated in the form of *I*, followed by the final grade. The indication of *I* cannot be removed from the transcript. An indication of *I* that is not changed within this period automatically becomes an *IF*. The *I* cannot be changed by reregistering for the course at GW or by taking its equivalent elsewhere. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the Dean's Council for additional time in which to complete the work of the course. Such petitions should be submitted within a year of the assignment of the *I*. Students will not be permitted to register for any additional course work if they have more than two Incompletes on their record.

Pass/No Pass Option—A student who has a cumulative grade-point average of 2.5 or better may, with the approval of an advisor and the dean, take one course per semester and receive a grade of *P*, Pass, or *NP*, No Pass, which will be recorded on the student's transcript but will not be reflected in the cumulative grade average. A student must sign up for such an option at the Office of Academic Advising within the first eight weeks of classes. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of the eighth week of the semester. Foreign language courses and required courses in the student's degree program (except those in which the grade of *P* or *NP* is normally assigned) may not be taken on a pass/no pass basis. Freshmen may not elect to take a course on a pass/no pass basis. A transfer student may not elect to

take a course on a pass/no pass basis until the second semester of enrollment in the University. No more than six courses in which the grade of *P* or *NP* is assigned will apply toward the degree, including courses in which the grade of *P* or *NP* is normally given.

Academic Work Load—The normal academic work load for a full-time student is 15 credit hours. A full-time student not on probation may take a course load of up to 17 credit hours. A student with a strong academic record may take up to 18 credit hours with the approval of the Office of Academic Advising (additional tuition charges apply). Students doing internships or working are advised to reduce their course load.

Study Abroad—Students are encouraged to travel and study abroad. Those wishing to study abroad must consult their academic advisor and the University's Office for Study Abroad. A maximum of 34 credits may be transferred in from study abroad. GW courses taken abroad for GW credit do not apply to this maximum (i.e., specific courses taken through GW Study Centers and GW Summer Abroad for which students receive GW credit as opposed to transfer credit). Students must secure prior approval from the Office of Academic Advising for any plan of study abroad if the credit earned is intended to apply to the degree program in which they are registered. Students must apply to a program from the University's List of Study Abroad Programs. A catalogue or other description of the study abroad program must be presented for consideration together with detailed descriptions of the courses to be taken. See Study Abroad Programs.

Internships—Internships offer students the opportunity to make practical use of the knowledge they acquire in the classroom. Undergraduates who have completed at least 30 credit hours and have a cumulative grade-point average of at least 2.5 are eligible to arrange internships for credit (to a total maximum of 6 credits toward the degree). Transfer students

are not eligible to arrange internships for credit until their second semester at GW.

Academic work in the field of the internship is required. A zero-credit internship is also available. Internships are available in the private, nonprofit, and public sectors. Students must register for internships (even if for zero credit) through the Office of Academic Advising but are responsible for locating their own internships; listings are posted at gwired.gwu.edu/career.

Double Majors—Students who complete the requirements of two majors in the Elliott School (such as international affairs and Asian studies) may graduate with a double major. Consult the Office of Academic Advising to officially declare both majors on the appropriate form.

Students in the Elliott School may take a second major offered by Columbian College of Arts and Sciences or the School of Engineering and Applied Science (majors in communication, English and creative writing, journalism and mass communication, and political communication are excluded). Permission for the second major must be obtained from the appropriate administrative office of the other school.

Students in Columbian College of Arts and Sciences and the School of Engineering and Applied Science may take a second major in the Elliott School. Students wishing to pursue these options must request approval through the Elliott School Office of Academic Advising. Students must complete all degree requirements for their major in their home school in order to graduate with a second major from the other school.

In all cases, double majors do not result in two degrees. See Double Majors and Double Degrees under University Regulations.

Secondary Fields of Study—Elliott School students can take a secondary field of study, such as business, economics, or languages, in other schools of the University. Students from other schools of the University can take a secondary field of study in international affairs in the Elliott School. Contact the Office of Academic Advising in the Elliott School.

SCHOOL OF PUBLIC HEALTH AND HEALTH SERVICES

Dean L.R. Goldman

Senior Associate Dean J.J. Reum

Associate Deans Julie DeLoia, Kimberly Horn

The School of Public Health and Health Services was established within The George Washington University in 1997. Seven departments form SPHHS: Environmental and Occupational Health, Epidemiology and Biostatistics, Exercise Science, Global Health, Health Policy, Health Services Management and Leadership, and Prevention and Community Health.

Degree programs offered by SPHHS include the Bachelor of Science with majors in exercise science and public health; the Master of Public Health; the Master of Health Services Administration; the Master of Science in the fields of exercise science, health policy, and public health microbiology and emerging infectious diseases; and the Doctor of Public Health. SPHHS offers a Bachelor of Science/Master of Public Health dual degree program and cooperates with several other schools within GW in offering combined degree programs. Secondary fields for undergraduates in schools other than SPHHS and graduate certificate programs are offered as well.

SPHHS Regulations

SPHHS undergraduates must show timely progress toward the degree and must attain grades no lower than *C–* in required major field courses. If a student receives a grade of *D+*, *D*, or *D–* in a course specifically required for the major, the student will be required to repeat the course until a satisfactory grade (*C–* or better) is earned. Once the student has completed the course with a satisfactory grade, credit hours earned the first time the course was taken will count toward the minimum number of credit hours required for the major. Credit hours earned toward the repetition do not count toward the degree.

Other SPHHS regulations governing the following subjects are analogous to those of Columbian College of Arts and Sciences: residence; academic work load; academic standing (including probation, suspension, semester warning, and mid-semester warning); dean's lists; incompletes; pass/no pass option; and placement, waiver, and credit examinations. See the section headed Columbian College of Arts and Sciences.

Special Honors—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in exercise science must have a grade-point average of at least 3.5 in required courses in the major and at least a 3.25 average overall. The candidate must submit an honors paper in ExSc 4110 that is approved by at least two full-time faculty members.

Bachelor of Science Degree Programs

Exercise Science

The Bachelor of Science with a major in exercise science prepares students for careers in health promotion, corporate fitness and wellness programs, exercise physiology, personal training, exercise rehabilitation, and coaching, as well as graduate study in exercise science, sport psychology, physical therapy, medicine, and other clinical health professions.

Students applying to the exercise science major may enter the program as freshmen or as transfer students with a minimum grade-point average of 2.5.

Students in the exercise science major may select the pre-physical therapy concentration, the pre-dietetics concentration, the pre-athletic training/sports medicine concentration, or the pre-medical professional concentration (for those planning to enter an M.D., physician assistant, or nursing program upon graduation). The exercise science major may also be taken without a concentration. Course requirements for the 124-credit program can be found at sphhs.gwumc.edu/academics/undergraduateprograms.

Public Health

The Bachelor of Science with a major in public health aims to increase understanding of public health principles for students who intend graduate study toward careers in law, medicine or another health profession, or public health. The program is also available to students who plan to pursue entry-level jobs in sectors of public health or health services. With a liberal arts base, the program emphasizes technical detail and analytic skills, nurturing critical thinking and synthesis of information in recognizing historical and societal associations of trends in public health and health care delivery.

Students may apply to enter the 120-credit-hour public health major during the semester prior to completing 60 credits with a minimum grade-point average of 3.0. General education requirements listed under Columbian College of Arts and Sciences must be completed, with exceptions indicated at sphhs.gwumc.edu/academics/undergraduateprograms/publichealth. Required courses in the major are PubH 1101, 1102, 2110, 2111, 2112, 3130, 3131, 3132, 3133, 3135, 4140, and 9

credits of SPHHS electives chosen from specified courses with approval of the advisor. The remainder of the program may be a secondary field, a minor, or approved electives.

Students interested in the dual degree program consisting of the Bachelor of Science with a major in public health and the Master of Public Health should consult SPHHS admissions during the semester prior to completing 60 credits.

Secondary Fields of Study

Secondary fields of study in public health, health and wellness, and exercise science are available to undergraduates in other schools of the University. See the entries for Exercise Science and for Public Health in the course listings section for courses that pertain to these secondary fields. SPHHS students may choose a secondary field from Columbian College of Arts and Sciences, the Elliott School of International Affairs, or the Schools of Business, Engineering and Applied Science, or Medicine and Health Sciences.

SCHOOL OF MEDICINE AND HEALTH SCIENCES

The School of Medicine and Health Sciences offers programs to prepare health sciences professionals in selected disciplines, emphasizing the interdependent roles of the network of professionals who constitute the health care team. For specific information on the requirements of the undergraduate degree programs described briefly below, see www.gwumc.edu/healthsci.

Bachelor of Science in Health Sciences Degree Programs

In addition to the Bachelor of Science in Health Sciences degree programs listed here, certificate programs are offered in several areas—some in conjunction with degree programs, others freestanding. All undergraduate health sciences programs are designed for upper-division transfer students who have completed a minimum of 60 credit hours of

specified course work at an accredited postsecondary institution. The Bachelor of Science in Health Sciences may be earned via distance education in clinical management and leadership, clinical research administration, clinical laboratory science, and emergency health services.

Pharmacogenomics—The field of pharmacogenomics is emerging as more is learned about the genetic structure in the human body. Students enrolled in the pharmacogenomics major may apply for admission to the Doctor of Pharmacy degree program in Shenandoah University's Bernard J. Dunn School of Pharmacy; students accepted for admission may be enrolled in the second year of Shenandoah's Pharm.D. program upon completion of their GW degree. Alternatively, graduates of the pharmacogenomics program are qualified to pursue a graduate degree or work in the biotechnology or pharmaceutical field.

Applicants to the full-time 129-credit-hour program must have a grade-point average of 3.0 in 60 credits of specified prerequisite courses.

Clinical Laboratory Science—Clinical laboratory scientists perform and evaluate various laboratory procedures to determine the absence, presence, extent, and basis of disease. As medical investigators, program graduates perform complex examinations on state-of-the-art instruments and computers in the areas of hematology, chemistry, microbiology, immunology, and blood banking.

Applicants to the 120-credit-hour program must have satisfactorily completed 65 credits in specified courses, complete a telephone interview, and submit an Essential Functions Acknowledgement Form.

Emergency Health Services—Emergency health services personnel may plan and organize programs, supervise emergency department clinicians, assist in projects that

require expertise in emergency medical procedures, and function in the network of information systems that is central to emergency care.

Applicants must hold certification as an Emergency Medical Technician. Where applicable, the following records should be provided: proof of current participation in an emergency medical services system and photocopies of scores or certificates from national registry examinations or certifying board examinations. The program requires 120 credit hours. A bachelor's/master's dual-degree program is available.

Clinical Management and Leadership—The major in clinical management and leadership has been developed for health care professionals prepared at the associate's degree level (e.g., radiographers, respiratory therapists, nurses, medical laboratory technicians) to broaden knowledge and experience in health sciences services and develop pathways for career advancement.

Applicants must submit documentation of an associate's degree or equivalent preparation in a health sciences discipline and current professional certification or other appropriate health science credential. The program requires 120 credit hours. Bachelor's/master's dual-degree programs are available.

Clinical Research Administration—Clinical research administration is a large and expanding field that involves the processes in which products (drugs, devices, biologicals) and treatment protocols are developed for patient care. This major prepares health sciences professionals to participate in the science and business of developing these patient care products and protocols.

Applicants must submit documentation of completion of at least 60 credit hours of college-level course work and current professional certification or other appropriate health

sciences credentials. The program requires 120 credit hours. Bachelor's/master's dual-degree programs are available.

Sonography—Diagnostic medical sonographers scan patients to obtain images that help physicians diagnose disease. Five majors are available within this full-time program: vascular sonography (125 credit hours), cardiac sonography (125 credit hours), general sonography (127 credit hours), vascular and cardiac sonography (130 credit hours), and vascular and general sonography (132 credit hours).

Students applying to the program must have satisfactorily completed 60 credits in specified course work, of which up to 48 credits may be from completion of an approved program in diagnostic radiology, nuclear medicine technology, radiation therapy technology, or diagnostic medical sonography, provided students hold or will hold current registration during the first semester of study at GW.

Secondary Fields of Study

See Health Sciences, Anatomy, and Biochemistry and Molecular Biology in the course listings section for courses that pertain to secondary fields in these subjects. See www.gwumc.edu/healthsci, www.gwumc.edu/anatomy, and www.gwumc.edu/biochem. Information on the secondary field in emergency health services can be found at www.gwumc.edu/healthsci/programs/ems_sfs/.

The Doctor of Medicine Early Selection Program

The School of Medicine and Health Sciences offers an early selection program intended to give talented and committed students early assurance of admission to the M.D. program. Students of exceptional promise are chosen for the early selection program at the end of their sophomore year and are expected to modify their planned curriculum for the junior and

senior years toward more creative and difficult course choices. Early assurance of admission is planned to provide students the freedom to pursue a rigorous liberal education, while completing minimal premedical requirements without concern for the grade-point average. Specific details about the early selection program are available through the Office of Admissions of the School of Medicine and Health Sciences.

SCHOOL OF NURSING

Bachelor of Science in Nursing

A second-degree program, the Bachelor of Science in Nursing, is offered by the School of Nursing to students who already hold a bachelor's degree. B.S.N. graduates are prepared to be generalist nurses who provide direct patient care and coordinate and manage patient care. Based at GW's Virginia Science and Technology Campus, the B.S.N. program is taken on a full-time basis over four semesters. A bachelor's/master's dual-degree program has been established, by which up to 12 of the 60 credit hours constituting the Bachelor of Science in Nursing may be applied as cross-credits toward the Master of Science in Nursing. In addition, the School of Nursing offers a B.S.N./M.S.N. dual degree program in nursing advancement to licensed registered nurses with associate's degree preparation. Further information is available at nursing.gwumc.edu.

Courses

COURSES OF INSTRUCTION

This section provides listings and descriptions of undergraduate courses offered by the departments and programs of the GW schools included in this Bulletin. Degree requirements of departments and programs in Columbian College of Arts and Sciences appear under the department or program heading; degree requirements of the School of Engineering and Applied Science, the School of Business, the Elliott School of International Affairs, and the School of Public Health and Health Services appear under the respective school's section.

The number of credit hours given for the satisfactory completion of a course is indicated in parentheses after the title of the course. An academic-year course giving 3 credits each semester is marked (3–3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

The term *academic year* is used with two-semester courses and generally indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Few offerings for the summer sessions are listed in this Bulletin; consult www.gwu.edu/summer for additional summer offerings. Schedules of Classes are available online at www.gwu.edu/~schedule.

Note that prerequisites indicated near the end of course descriptions are often followed by the phrase *or equivalent*, although this should be understood in all cases; academic departments may require faculty approval of equivalent prerequisites. Prerequisites that pertain to many or all of a department's courses appear in a note preceding either the department's full course list or the set of courses concerned.

The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to add course fees.

Key to Abbreviations

The following abbreviations are used for course designations. (The list excludes designations for courses limited to students in the School of Medicine and Health Sciences and the School of Nursing.)

ACA	Classical Acting
Accy	Accountancy
AfSt	Africana Studies
AmSt	American Studies
Anat	Anatomy
Anth	Anthropology
ApSc	Applied Science
Arab	Arabic
AH	Art History
ArTh	Art Therapy
Astr	Astronomy
Bioc	Biochemistry
BiSc	Biological Sciences
BmSc	Biomedical Sciences
Bios	Biostatistics
BAdm	Business Administration
Chem	Chemistry

Chin	Chinese
CE	Civil Engineering
Clas	Classical Studies
CPS	College of Professional Studies
CCAS	Columbian College of Arts and Sciences
Comm	Communication
CSci	Computer Science
Cnsl	Counseling
CPed	Curriculum and Pedagogy
DnSc	Decision Sciences
EALL	East Asian Languages and Literatures
Econ	Economics
Educ	Educational Leadership
ECE	Electrical and Computer Engineering
EHS	Emergency Health Services
EMSE	Engineering Management and Systems Engineering
Engl	English
EAP	English for Academic Purposes
EnRP	Environmental Resource Policy
Epid	Epidemiology
ExSc	Exercise Science
Film	Film Studies
Fina	Finance

FA	Fine Arts
ForP	Forensic Psychology
ForS	Forensic Sciences
Fren	French
Geog	Geography
Geol	Geological Sciences
Ger	German
GreK	Greek
PSHC	Health Care Corporate Compliance
HSci	Health Sciences
HSML	Health Services Management and Leadership
HIWI	Health and Wellness
Hebr	Hebrew
Hist	History
HomP	Hominid Paleobiology
Honr	Honors
HDev	Human Development
HOL	Human and Organizational Learning
HmSr	Human Services
ISTM	Information Systems and Technology Management
IntD	Interior Architecture and Design
IAff	International Affairs
IBus	International Business

Ital	Italian
Japn	Japanese
JStd	Judaic Studies
Kor	Korean
PSLD	Landscape Design
Latn	Latin
Law	Law
PSLM	Law Firm Management
LgAf	Legislative Affairs
LSPA	Lifestyle, Sport, and Physical Activity
Ling	Linguistics
Mgt	Management
Mktg	Marketing
MBAd	Master of Business Administration
Math	Mathematics
MAE	Mechanical and Aerospace Engineering
Micr	Microbiology and Immunology
PSMB	Molecular Biotechnology
MMed	Molecular Medicine
MStd	Museum Studies
Mus	Music
NSc	Naval Science
OrSc	Organizational Sciences

PSLX	Paralegal Studies
Path	Pathology
PStd	Peace Studies
Pers	Persian
Phar	Pharmacology
Phil	Philosophy
Phys	Physics
Phyl	Physiology
PMgt	Political Management
PPsy	Political Psychology
PSc	Political Science
Port	Portuguese
PsyD	Professional Psychology
Psyc	Psychology
PubH	Public Health
PSPL	Public Leadership
PPPA	Public Policy/Public Administration
PSPR	Public Relations
PSPB	Publishing
Rel	Religion
Rom	Romance Literatures
SEAS	School of Engineering and Applied Science
SMPA	School of Media and Public Affairs

PSSL	Security and Safety Leadership
Slav	Slavic
Soc	Sociology
Span	Spanish
SpEd	Special Education
SpHr	Speech and Hearing
Stat	Statistics
SMPP	Strategic Management and Public Policy
Sust	Sustainability
TrDa	Theatre and Dance
TStd	Tourism Studies
Turk	Turkish
Univ	University
UW	University Writing
Viet	Vietnamese
WLP	Women's Leadership Programs
WStu	Women's Studies
Ydsh	Yiddish

Explanation of Course Numbers

The following numbering system is used. Courses in the 1000s are primarily introductory undergraduate courses; those in the 2000–4000s are upper-division undergraduate courses that can also be taken for graduate credit with permission and additional work; those in the 5000s are special courses or part of special programs available to all students as part of

ongoing curriculum innovation; those in the 6000s and 8000s are for master's, doctoral, and professional-level students. The 6000s are open to advanced undergraduate students with approval of the instructor and the dean or advising office.

Double-numbered courses are generally numbered consecutively (e.g., 6342–43). In a small number of cases, however, a set of courses is intended to be taken in sequence, has a single title and description, but carries non-consecutive numbers; in such a case, the second number appears directly below the first. This should be noted, because the department's courses may therefore be listed non-consecutively.

ACCOUNTANCY

Professors K.R. Kumar (*Chair*), S.H. Kang, A. Lusardi, C. Linsley (*Teaching*)

Associate Professors L.G. Singleton, K.E. Smith, L.C. Moersen, F. Lindahl, R.L. Tarpley,

A. Gore, S. Kulp, C.L. Jones (*Industry*)

Assistant Professors Y. Li, Y. Xue, I.Y. Kim, C. Zhang, C. Petrovits, L. Tan, K. Ray, B.

Ferman (*Research*)

Professorial Lecturers T. Verghese, R. Laycock, M. Melton

See the School of Business for the program of study leading to the degree of Bachelor of Accountancy.

2001 Introductory Financial Accounting (3) Li, Linsley, Tarpley, and Staff

The fundamental concepts underlying financial statements and the informed use of accounting information. Analysis and recording of business transactions; preparation and understanding of financial statements. Measurement of the profitability and financial position of a business. Prerequisite: sophomore standing. (Fall and spring)

2002 Introductory Managerial Accounting (3) Staff

The use of accounting information to plan and control the activities of a business. Several widely used methods of determining the cost of business activities for use in making business decisions. The statement of cash flows. Prerequisite: Accy 2001. (Fall and spring)

3101 **Intermediate Accounting I (3)** Singleton, Xue

Accounting principles underlying the preparation of financial statements and their application in the measurement and reporting of selected balance sheet items and related revenue and expense recognition; accounting for receivables, inventories, fixed assets, intangible assets, and liabilities. Prerequisite: Accy 2001. (Fall)

3102 **Intermediate Accounting II (3)** Tarpley

Accounting for stockholders' equity, earnings per share, debt and equity investments, income taxes, pensions and other postretirement benefits, leases, accounting changes, statement of cash flows, financial statement analysis and disclosure. Prerequisite: Accy 2001. (Spring)

3103 **Advanced Financial and Tax Accounting (3)** Smith

Financial and tax accounting issues relating to corporations and partnerships, including formation, operation, and liquidation of each type of entity. Financial accounting for corporate combinations. Prerequisite: Accy 3101, 3401. (Spring)

3106 **Financial Statement Analysis (3)** Jones

Introduction to the analysis and interpretation of corporate financial statements within the context of a company's industry and economic environment. Cash flow analysis, profitability and risk analysis, accounting policy analysis, forecasting and performance

analysis, elements of equity valuation, and decision perspectives of creditors. Prerequisite: Accy 2002.

(Fall and spring)

3401 **Federal Income Taxation (3)** Smith

A study of federal income tax concepts, including what shall be taxed, and when, and at what rate. Taxable entities, income measurement, the use of different tax rates for different types of income, and the use of the tax laws to motivate taxpayer behavior to achieve economic goals. (Fall)

3601 **Business Law: Contracts, Torts, and Property (3)** Moersen

Essential legal principles of contracts, torts, and property, including trusts and estates, leases, professional liability, and the Uniform Commercial Code.

(Fall)

4201 **Advanced Managerial Accounting (3)** Staff

Techniques and practices that foster an informed use of financial information for planning, resource allocation, performance evaluation, and control purposes. Integration of concepts from other disciplines, especially economics, quantitative methods, behavioral science, and business policy and strategy. Primarily taught using case method. Prerequisite: Accy/BAdm 2002. (Spring)

4301 **Auditing (3)** Gore

A study of generally accepted auditing standards and accepted professional auditing practices and procedures, including reviewing and evaluating financial controls, auditing financial statements, and testing financial data of manual and automated accounting systems. Prerequisite: Accy 3102. (Fall)

4501 Accounting Systems (3)

Staff

Introduction to the design and operation of accounting systems and data-management controls. Principles and applications of internal control applicable to manual and automated accounting systems. Prerequisite: Accy 3102. (Fall)

4601 Business Law: Enterprise Organization (3)

Moersen

The legal aspects of organizing, financing, and operating an enterprise: agency, partnerships, corporations, securities regulation, insurance, secured credit financing, and commercial paper. Prerequisite: Accy 2001. (Spring)

4801 Financial Accounting Capstone (3)

Jones

Synthesis and application of knowledge of financial accounting to specific contexts, using the perspectives of the preparer and user of financial statements. Prerequisite: senior status. (Spring)

4900 Special Topics (3)

Staff

Experimental offering; new course topics and teaching methods. Prerequisite: department approval.

4995 Independent Study (3)

Staff

Assigned topics. Admission by permission of the department chair.

(Fall and spring)

AFRICANA STUDIES

Committee on Africana Studies

J. James (*Director*), N. Blyden, H.G. Carrillo, S. Lubkemann, J.A. Miller, G. Squires, G.

Wald, A. Zimmerman

Offered through Columbian College of Arts and Sciences, the Africana studies major provides an interdisciplinary and integrated course of study of Africa and the African diaspora.

Bachelor of Arts with a major in American studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required for the major—39 credits, including AfSt 1001 taken within three semesters of declaring the major; four courses in African American studies, including Hist 3360, Soc 2179, Engl 3570 or 3950, and another course chosen from designated courses; four courses in African studies, including Anth 3708, Hist 3520 or 3540, and two additional courses chosen from designated courses; two courses in Latin American, Latino, and Caribbean studies, including Hist 3710 and another course chosen from designated courses; an upper-division course in gender studies chosen from designated courses (this course may also count toward one of the above categories); an additional course chosen in consultation with the Africana program advisor. Lists of designated courses may be found at www.gwu.edu/~afst/home/index.cfm.

Minor in Africana studies—Required: 21 credit hours, including AfSt 1001, with the remaining courses chosen in consultation with the director of Africana studies.

1001 Introduction to Africana Studies (3)

Blyden

An interdisciplinary introduction to the study of people of Africa and the African diaspora in historical context. Links in the cultural, political, and intellectual experiences of people of African descent in the Americas, Caribbean, Europe, and Africa.

AMERICAN STUDIES

University Professor V.N. Gamble

Professors J.M. Vlach, R.W. Longstreth, J.A. Miller

Associate Professors T.A. Murphy, M. McAlister, C. Heap (*Chair*), T. Guglielmo, J.K.

Kosek, S. Osman

Assistant Professors E. Peña, E. Anker, J. Nash, C.L. Warren, J.N. Cohen-Cole

Professorial Lecturers R.D. Wagner, O. Ridout, F. Goodyear, N.E. Davis, K. Ott, J.

Deutsch

Bachelor of Arts with a major in American studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in related areas—Two semesters of foreign language or placement into the third semester of a foreign language by examination; also, one course on a foreign culture, either selected from the CCAS list of foreign culture courses or as approved by the department.
3. Requirements for the major—AmSt 2010, 2011, 3900, 3901, 4500, and five courses in the student's area of focus. Areas of focus are cultural politics; global connections; and space, place, and society. A list of appropriate courses for each area of focus is maintained by the department. At least three of the five courses in the area of focus must be offered by the American studies faculty.

Combined Bachelor of Arts/Master of Arts in the field of American studies—Students interested in the dual degree program should consult the department by the middle of the junior year.

Special Honors—For Special Honors in American studies, a major must meet the special honors requirements stated under University Regulations, be recommended by the faculty, and receive a grade of *A* on the senior paper written for AmSt 4500.

Minor in American studies—Required: 18 credit hours, including AmSt 2010, 2011, and four additional AmSt courses at the 2000–3000 level.

1050	Explorations in American Culture (3)	Staff
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Exploration of different aspects of American culture depending on the topic. Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

1070 **The American Cinema (3)** Deutsch

History and criticism of American films. The course enables the student to recognize and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture. Laboratory fee. Same as AH 1070.

1100	Politics and Film (3)	Anker
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How American films interpret and challenge political power in America.

1160 **Race, Gender, and Law (3)** Nash

Significant civil rights cases, critical race theory, feminist theory, and current public policy debates on domestic violence, mass imprisonment, sexual assault, and racial profiling.

2010 Early American Cultural History (3) Murphy

How culture was important in the creation of the United States—in its origins as a colonial outpost and its expansion across the continent; in its hierarchies and expressions of power, especially as organized by race, class, ethnicity, or gender; in the creation of

democracy and the valuing of free expression; and in the development of cities and the varied uses of the countryside. Same as Hist 2010.

2011 **Modern American Cultural History (3)** Kosek

The effects of culture in the shaping of the United States since 1876. The role of the mass media; effects of cultural conceptions on the physical landscape; changing ideas of race, ethnicity, gender, and sexuality; and the political meanings of cultural conflict.

Transnational influences on U.S. culture and effects of U.S. culture abroad. Same as Hist 2011.

2020 **Washington, D.C.: History, Culture, and Politics (3)** Staff

Introduction to interdisciplinary methods of studying the contemporary city. Major problems of metropolitan life, past and present, analyzed by faculty and community leaders.

Emphasis on experiential team projects. Same as Hist 2020.

2071 **Introduction to the Arts in America (3)** Staff

Same as AH 2071.

2120 **Freedom in American Thought and Popular Culture (3)** Anker

America was founded on the premise of providing freedom to its people. But what, exactly, is freedom? The question has been debated in America since its founding and continues today; this course examines varied answers provided by American political thought and popular culture. Same as PSc 2120.

2125 **Varieties of Feminist Theory (3)** Nash

Same as WStu 2125.

2144 **Explorations in Historical Geography (3)** Staff

Examination of selected themes in the cultural geography of the United States over the course of its history, in relation to an overview of the historical geography of the country.

Same as Geog 2144.

2320 U.S. Media and Cultural History (3)

McAlister

History and analysis of 20th-century U.S. media and culture, including the rise of consumer culture, film, and television. Racial, gendered, and national identities in the context of modernism, mass culture, and globalization. Same as Hist 2320.

2350 U.S. Religion and Politics (3)

Kosek

How religion and politics have influenced each other in the United States and how Americans have understood those influences. Religious violence; conflicts between faith and science; religious factors in racial and gender politics; and the separation of church and state. Same as Hist 2350.

2380 Sexuality in U.S. History (3)

Heap

Examination of the changing social organization and meaning of sexual practices and desires in American culture, with particular attention to the relationship between sexuality and gendered racial and class identities and politics. Same as Hist/WStu 2380.

2410 20th-Century U.S. Immigration (3)

Guglielmo

Survey of immigration policy and immigrants' lives. How immigrants have changed the United States and how the United States has changed immigrants. Same as Hist 2410.

2440 The American City (3)

Osman

An interdisciplinary introduction to the ethnic, cultural, political, and architectural landscape of the American city. Urban theory, race and ethnicity, urban history, planning and architecture, city politics, and cultural representations of the city. Same as Hist 2440.

2490 Themes in U.S. Cultural History (3)

Peña, Warren

Topical examination of the ideas, values, and modes of expression that have made American life distinctive, as revealed through a cross-cultural or global perspective. Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Same as Hist 2490.

2495 Special Topics in African American History (3)

Staff

Concentration on specific issues central to the African American experience. Consult the Schedule of Classes for issues to be addressed.

2520–21 American Architecture (3–3)

Longstreth

Stylistic properties, form and type characteristics, technological developments, and urbanistic patterns are introduced as a means of interpretation of historic meaning. Buildings are analyzed both as artifacts and as signifiers of social, cultural, and economic tendencies. AmSt 2520: 1600–1860; AmSt 2521: 1860–present. Same as AH 2154–55.

2530 Folk Arts in America (3)

Vlach

Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. Same as AH 2156.

2532 Introduction to Folklore (3)

Vlach

Survey of the forms of folk expression, including verbal art, music, dance, and material culture. Examination of the materials and methods of folklore research. Same as Anth 2532.

2533 Material Culture in America (3)

Vlach

Review and analysis of the cultural messages embedded in our material surroundings. Consideration of a range of humanly created artifacts, ranging from specific objects to vast landscapes. Same as Anth 2533.

2710 **The United States in Global Context, 1898–Present** (3) McAlister

How the 20th- and 21st-century U.S. has been engaged globally, both politically and culturally, with attention to global culture, transnational ideas and social movements, foreign policy, and economic transformations. Same as Hist 2710.

2730 **World War II in History and Memory** (3) Guglielmo

Examination of Americans' histories and memories of World War II. Same as Hist 2730.

2750 **Latinos in the United States** (3) Peña

Exploration of the term *Latino* and its impact on discussions of race, identity, and citizenship expectations throughout U.S. history. How geographic, linguistic, aesthetic, political, and economic factors construct Latino identity and influence policymaking and international relations. Same as Anth 2750.

3151 **American Art in the Age of Revolution** (3) Staff

Same as AH 3151.

3152 **American Art in the Era of National Expansion** (3) Staff

Same as AH 3152.

3324 **U.S. Urban History** (3) Klemek

History of American urban life and culture from the colonial era to the present, focusing on transitions from pre-industrial to industrial and post-industrial forms. The social

and spatial configuration of U.S. cities, and the urban politics of race, class, and gender.

Same as Hist 3324.

3351 **U.S. Social History** (3) Stott

Same as Hist 3351.

3352–53 **Women in the United States** (3–3) Harrison, Murphy

Survey of women's experience in U.S. history, the way gender has organized relations of power, and the impact of race, region, class, and ethnicity on women and on gender roles.

Same as Hist/WStu 3352–53.

3360–61 **African American History** (3–3) Chapman

Same as Hist 3360–61.

3362 **Black Women in U.S. History** (3) Chapman

Same as Hist/WStu 3362.

3810 **Building Cities** (3) Staff

Same as Geog 3810.

3811 **Historical Archaeology** (3) Staff

Same as Anth 3811.

3835 **Historical Archaeology Field Program** (3) Staff

Same as Anth 3835.

3900 **Critiquing Culture** (3) Anker, McAlister

Modes of analysis, including ethnography and other cultural studies methods, applied to examination of the interaction of cultural texts and practices with structures of power.

Theories and themes central to American studies; scholarly debate about mass culture,

ideology, visuality, discourse, and affect. For departmental majors; minors admitted with permission of instructor.

3901 Examining America (3)

Osman, Peña

Modes of power and forms of identification within and across U.S. national borders. Social constructions of the nation; forms of diversity and identity, such as race, gender, and sexuality; and the transnational flow of people, ideas, culture, and religion. For departmental majors; minors admitted with permission of instructor.

3950 Special Topics (3)

Staff

May be repeated for credit provided the topic differs. Topic announced in the Schedule of Classes.

4400 Independent Study (1 to 3)

Staff

Open to a limited number of American studies majors as directed research or as an internship with a Washington museum or historical society. Approval of advisor required.

4500 Proseminar in American Studies (3)

Staff

For American studies majors. Directed research and writing on special topics. Prerequisite: at least two of the required courses for the major (AmSt 2010, 2011, 3900, 3901). May be repeated for credit provided the topic differs.

ANATOMY

The Department of Anatomy and Regenerative Biology in the School of Medicine and Health Sciences offers the following courses that pertain to the secondary field in human anatomy and are available to undergraduates across the University.

2130 Human Embryology (3)

Development of the basic organ systems; molecular control of development, congenital birth defects, and assisted reproductive technologies.

2150 Human Microscopic Anatomy (3)

Normal histological structure of cells, tissues, and organs. Structural–functional correlates; the relationship between histological structure–function and the etiology of disease states.

2160 Human Functional Neuroanatomy (3)

The central and peripheral nervous systems; diseases and injuries with impact on the normal structural–functional relationship.

2181 Human Gross Anatomy (3)

Structure and function of the musculoskeletal system; regional organization, structure, and function of the major organ systems; structural organization of the head and neck. Same as BiSc 2581.

ANTHROPOLOGY

University Professor B. Wood

Professors A.S. Brooks, J.M. Vlach, J.C. Kuipers, B.D. Miller, R.R. Grinker, E.H. Cline

Associate Professors M. Edberg, B.G. Richmond (*Chair*), S.C. Lubkemann, C. Sherwood,

A.S. Dent, J. Blomster, I. Feldman, R. Bobe

Assistant Professors R.M. Bernstein, R. Shepherd, E. Uretsky, S.C. McFarlin, C.M. Murray,

A. Ahmad, S.E. Wagner, D.R. Braun

Professorial Lecturers P.J. Cressey, D.H. Ubelaker, R. Potts, J. Love, S. Johnston, L.

Brown, M. Merritt, J. Donaldson, D. Hunt

Bachelor of Arts with a major in anthropology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Anth 1001, 1002, 1003, and 1004.
3. Required courses in other areas—(a) two-year proficiency in a foreign language approved by the Anthropology Department; (b) 6–12 credits of course work in related departments approved by the advisor. Recommended for sociocultural emphasis are courses in economics, history, political science, psychology, religion, and sociology; for archaeological emphasis, courses in American studies, art history, geography, geological sciences, and history; for emphasis in biological anthropology, courses in anatomy, biological sciences, chemistry, and physical geography; for emphasis in linguistic anthropology, courses in linguistics and in speech and hearing science. Courses in statistics are strongly recommended for all anthropology majors.
4. Requirements for the major—In addition to the four prerequisite courses, 24–36 credits in anthropology courses, including Anth 2008, an approved methods course, and at least one course from four of the following five categories: aspects of culture, linguistics, ethnology, biological anthropology, and archaeology. In addition, a senior capstone experience is required; it may be met by taking Anth 4008, 3995 (for 3 credits), or an approved 6000-level course. Qualified seniors may enroll in graduate-level courses with the permission of the instructor. Up to 6 credits of ethnographic or archaeological field school credit may be accepted and applied toward the major. Opportunities are available for field and laboratory research, both within the department and as internships in the Washington

area. Credit for such work (not to exceed one-quarter of the student's total upper-division credits in anthropology) may be granted through registration in Anth 3995.

See www.gwu.edu/~anth for courses that fulfill requirements indicated here.

Bachelor of Arts with a major in archaeology—An interdepartmental major offered by the Anthropology Department in cooperation with the Fine Arts and Art History Department and the Classical and Near Eastern Languages and Civilizations Department.

The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Anth 1002 and 1003.
3. Required courses in other areas—12 credits or equivalent in French, Spanish, Italian, German, Arabic, Hebrew, Latin, or Greek. Since graduate study in archaeology usually involves broader preparation and requires knowledge of at least one classical and one modern language, students intending to pursue graduate study should consult with the departmental advisor as early as possible in their undergraduate program.
4. Requirements for the major—(a) Anth 3838; (b) 18 credits of approved anthropological archaeology courses selected from the Anth 3800s that include 3–6 credits of field and laboratory work; (c) 15 credits selected from designated courses in ancient civilizations, with at least one course chosen in art history, classics, history, and regional archaeology. A given course can count toward only one category. In all cases, cross-listed courses may be substituted. See www.gwu.edu/~anth for more detailed information.

Bachelor of Science with a major in biological anthropology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Prerequisite courses—Anth 1001, 1002, 1003, and 1004; BiSc 1111–12.

3. Required courses—12 credit hours in biological anthropology and Paleolithic archaeology (Anth 3400s and 3832, 3802); 8 credit hours of approved upper-division BiSc courses; a minimum of 3 credit hours in a related natural or physical science or mathematics; 6 credit hours of sociocultural or linguistic anthropology or archaeology as listed above. The major in biological anthropology may not be pursued in conjunction with the major in anthropology.

Combined Bachelor of Arts with a major in anthropology or archaeology or Bachelor of Science with a major in biological anthropology and Master of Arts in the field of anthropology—Students interested in the dual degree program should consult the department before the beginning of the junior year.

Special Honors—For Special Honors in anthropology, archaeology, or biological anthropology, a major must meet the special honors requirements stated under University Regulations, have a grade-point average of 3.5 or better in courses required for the major, register for 3 credit hours of Anth 3995, Undergraduate Research, and write a paper of special distinction arising out of a program of directed reading or research. Students must confer with an advisor before beginning the work.

Minor in general anthropology—21 credit hours are required, including Anth 1001, 1002, 1003, 1004, and three additional courses in anthropology, which must be taken in different subdisciplines. For the purposes of this minor, the department's courses may be divided into subdisciplines as follows: biological anthropology—courses in the 3400s and 1005; archaeology—the 3800s; anthropological linguistics—the 2600s and 3600s;

sociocultural anthropology—all other upper-division courses, with the exception of Anth 3995.

Minor in archaeology—18 credit hours are required, including Anth 1003, 3838, and four courses chosen from Anth 3800s. An independent study course in archaeology or an approved art history course may be substituted for one of the four courses.

Minor in biological anthropology—16 credit hours are required, including Anth 1001 and 9 credits chosen from Anth 3400s and 1005; an approved field or research course or an approved course or course sequence in a related field (including biological sciences, geological sciences, psychology, statistics, and certain other disciplines).

Minor in sociocultural anthropology—18 credit hours are required, including Anth 1002; one course in ethnography (Anth 3700s); four courses in aspects of culture or methods and theory (Anth 3500s and 2501, 2533, 2532, 3991, 2008).

Minor in cross-cultural communication—18 credit hours are required, including Anth 1002, 1004; two courses in the Anth 3600s, one of which must be 3601 or 3602; a course in the 3500s or 3991; a course in the 3700s.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

1001 **Biological Anthropology (4)**

Richmond, Bobe, and Staff

Survey of human evolution, genetics and physical variation, and primatology. Regular laboratory exercises. Laboratory fee.

(Fall and spring)

1002 **Sociocultural Anthropology (3)**

Grinker, Ahmad, and Staff

Survey of the world's cultures, illustrating the principles of cultural behavior. (Fall and spring)

1003 **Archaeology** (3) Cline, Blomster, and Staff

Introduction to archaeological survey and excavation techniques and laboratory methods of dating and analysis. Brief history of archaeology and survey of world prehistory. Films and laboratory exercises.

(Fall and spring)

1004 **Language in Culture and Society** (3) Kuipers, Dent, and Staff

Comparison and analysis of how cultures use language to communicate. The relationship of language to issues of human nature, gender, race, class, artistic expression, and power. (Spring and summer)

1005 **The Biological Bases of Human Behavior** (4) Murray

Human behavior from an evolutionary perspective, including issues such as communication, intelligence, reproductive behavior, parental behavior, aggression, and cooperation, and drawing on an understanding of the behavior and biology of the nonhuman primates. Laboratory fee.

2008 **Foundations of Anthropological Thought** (3) Grinker, Wagner

The development of anthropological thought in historical context. Exploration of selected basic concepts and theories of contemporary anthropology. To be taken in the junior or senior year. Prerequisite: Anth 1002. (Spring)

2501 **The Anthropology of Gender: Cross-Cultural Perspectives** (3) Ahmad

Same as WStu 2121.

2505 **Introduction to Ethnomusicology** (3) Staff

Same as Mus 2105.

2532 **Introduction to Folklore (3)** Vlach

Survey of the forms of folk expression, including verbal art, music, dance, and material culture, and the interaction between folk forms and popular culture. The materials and methods of folklore research. Same as AmSt 2532.

2533 **Material Culture in America (3)** Vlach

Same as AmSt 2533.

2601 **Language and Linguistic Analysis (3)** Staff

Development of a fundamental understanding of the nature of language and its components, including phonology, morphology, syntax, semantics, and pragmatics. Discussion of major approaches, principles, and concerns in the field of linguistics. Same as Ling 2601. (Spring)

2750 **Latinos in the United States (3)** Staff

Same as AmSt 2750.

3401 **Human Functional Anatomy (3)** Richmond, McFarlin

The anatomy of the human body, how it works, and how it differs from other animals, especially other primates. Principles and approaches of functional morphology and biomechanics and how function can be reconstructed from fossils, with special focus on the musculoskeletal system. No prior knowledge of anatomy is required. Laboratory fee.

Prerequisite: Anth 1001.

3402 **Human Evolutionary Anatomy (3)** Richmond, Wood

The structure and function of human anatomy, as compared to our closest relatives, the great apes. Using this comparative approach, the course investigates the fossil record of human evolution, with an emphasis on reconstructing relationships, function, behavior, and adaptation in fossil hominins. Prerequisite: Anth 1001. (Fall)

3403 Forensic Anthropology Laboratory (2) Ubelaker

Identification of human skeletal remains by body part, age, sex, race, and individual disease or trauma history; study of skeletal variation in modern and recent populations.

Taught at the Smithsonian. Corequisite: Anth 3404. (Spring)

3404 Human Variation (1) Ubelaker

An overview of human variation, with special emphasis on the skeleton. Includes history of physical anthropology, individual and population variations, archaeological recovery of human remains, paleodemography, growth, paleopathology, and forensic anthropology. Prerequisite: Anth 1001; corequisite for undergraduates: Anth

3403. (Spring)

3405 Human Growth and Development (3) Bernstein

Modern human growth and development considered through an evolutionary perspective. The growth stages and life cycles of modern humans, emphasizing physiological and environmental influences and comparisons with extant non-human primates and fossil hominids. Prerequisite: Anth 1001. Laboratory fee. (Spring, alternate years)

3406 Advanced Human Osteology (3) Staff

Advanced techniques in determination of age, sex, ancestry, and pathological conditions using the skeleton. Taught at the Smithsonian. Prerequisite: Anth 3403, 3404.

3411 **Primateology** (3)

McFarlin, Murray

Physical and behavioral characteristics of the various primate groups and their relationship to human physical and cultural evolution. Prerequisite: Anth 1001. (Fall)

3412 **Hominin Evolution** (3)

Wood, Richmond

The fossil record of human evolution, including its context. Review of the fossil evidence that concentrates on the distinctive features of each taxon. Pleistocene remains. Laboratory fee. Prerequisite: Anth 1001.

3413 **Evolution of the Human Brain** (3)

Sherwood

Examination of how the human brain is unique in comparison to other animals, with an emphasis on understanding our species' distinctive neurobiology in terms of the evolution of cognitive abilities such as language, social comprehension, tool making, and abstract thinking.

3491 **Topics in Biological Anthropology** (3)

Staff

Topic announced in the Schedule of Classes. Instructors will be drawn from GW faculty and Smithsonian Institution staff. May be repeated for credit if topic varies. Prerequisite: Anth 1001.

3501 **Development Anthropology** (3)

Lubkemann and Staff

The impact of the world economy on nonindustrial societies. Analysis of the role of anthropology in international development programs aimed at alleviating problems in the Third World. Prerequisite: Anth 1002. (Fall and spring)

3502 **Cultural Ecology** (3)

Staff

Basic principles of cultural ecology. Human interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems. Prerequisite: Anth 1002 or permission of instructor.

3503 **Psychological Anthropology (3)** Grinker

The cross-cultural study of the relationship between culture and personality. Topics include emotion, conceptions of the self, mental health and illness, sexuality, marriage and parenting, and cognition. Psychobiological, cultural, ecological, and psychoanalytical theories are examined. Prerequisite: Anth 1002 or permission of instructor.

3504 **Illness, Healing, and Culture (3)** Miller

Introduction to medical anthropology. What the record of human evolution and prehistory tells about human health; the epidemiology of health and illness; how different cultures define disease; understanding illness and healing systems cross-culturally; and the role of medical anthropology in health care and international development. Prerequisite: Anth 1002 or permission of instructor.

3505 **Religion, Myth, and Magic (3)** Staff

Theories of religion developed by anthropologists; survey of world religions with emphasis on non-Western societies; religious processes and change. Same as Rel 3506.

3506 **Politics, Ethnicity, and Nationalism (3)** Staff

Comparative analysis of political systems; political processes, such as factionalism, styles of leadership, political ritual. Prerequisite: Anth 1002 or permission of instructor.

3507 **Kinship, Family, and Community (3)** Staff

Cross-cultural analysis of how people form, maintain, and transform social groups and boundaries. Focus on how communities such as family, ethnic group, and nation are defined in moral terms. Prerequisite: Anth 1002 or permission of instructor.

3508 **Art and Culture** (3) Staff

The role of art in culture, with emphasis on small-scale societies; influences upon the artist, and beliefs and practices associated with art production. Prerequisite: Anth 1002 or permission of instructor.

3509 **Symbolic Anthropology** (3) Staff

The study of culture through the analysis of symbolic systems including myth, cosmology, folklore, art, ritual, political symbolism, and the symbolic study of kinship. Prerequisite: Anth 1002 or 1004 or permission of instructor.

3513 **Human Rights and Ethics** (3) Shepherd, Feldman, and Staff

Issues of basic human rights and their violation by different cultures, states, and organizations. Genocide, ecocide, abuses on the basis of ethnicity, religion, or similar factors, and the treatment of those seeking asylum. Rights of informants and groups studied in anthropological research. Prerequisite: Anth 1002. (Fall and spring)

3521 **Ethnographic Film** (3) Kuipers and Staff

Still and motion-picture photography as an integral aspect of anthropological research. A study of recent and historic ethnographic films and an introduction to the forms and methods of making visual ethnographic records. Prerequisite: Anth 1002 or permission of instructor. Material fee.

3522 **Anthropology in Performance** (3) Staff

Exploration of the relationships among social interaction, ritual, and dramatic performance. Improvisation workshops and discussion based on readings about non-Western cultures.

3531 **Methods in Sociocultural Anthropology** (3) Lubkemann, Wagner

Approaches to field research. Conceptual bases and biases in the delineation of problems and in the selection, analysis, and organization of data. Students design and carry out their own field projects in the Washington area. Prerequisite: Anth 1002. (Spring)

3601 **Language, Culture, and Cognition** (3) Kuipers, Dent

The role of language and culture in the organization of human experience. Beginning with debates about linguistic relativity, the course explores the way language use shapes cognition and practice in a variety of cultures and social contexts. Prerequisite: Anth 1004. Laboratory fee. Same as Ling 3601. (Fall, alternate years)

3602 **Ethnographic Analysis of Speech** (3) Kuipers, Dent

Linguistic variation and change in discourse practices; social and political correlates of linguistic interaction; recording, transcription, and analysis of verbal interaction. Prerequisite: Anth 1004. Laboratory fee. Same as Ling 3602. (Fall, alternate years)

3603 **Psycholinguistics** (3) Staff

Language as species-specific property of the human mind. Psychological processes involved in the encoding and decoding of language; first and second language acquisition and bilingualism. Same as Ling 3603.

3691 **Special Topics in Linguistic Anthropology** (3) Kuipers and Staff

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Prerequisite: Anth 1004 or permission of instructor. Same as Ling 3691.

3701 **North American Native Peoples (3)** Staff

Comparative study of Indian groups representative of the different culture areas of the United States and Canada. Contemporary issues involving indigenous groups, the wider society, and the state. Prerequisite: Anth 1002 or permission of instructor.

3702 **Cultures of Latin America (3)** Dent and Staff

Culture history and ways of life in a selected region of Central or South America. Regional focus to be announced in the Schedule of Classes.
Prerequisite: Anth 1002 or permission of instructor.

3703 **Cultures of the Pacific (3)** Love

Culture history and ways of life among native peoples of Melanesia, Micronesia, and Polynesia. Prerequisite: Anth 1002 or permission of instructor.

3704 **Cultures of Southeast Asia (3)** Kuipers

Introduction to the history, art, ecology, and politics of Southeast Asia. Comparison and interpretation of recent ethnographic case studies, archaeological evidence, and current political events in order to understand the diversity of Southeast Asian traditions.
Prerequisite: Anth 1002 or permission of instructor.

3705 **Cultures of East Asia (3)** Shepherd and Staff

Intensive study of the culture and history of selected peoples of East, Central, or South Asia. Specific area to be announced in the Schedule of Classes.

May be repeated for credit. Prerequisite: Anth 1002 or permission of instructor.

3707 Cultures of the Middle East (3) Feldman

Geographic environment, language, religion, and social structure of settled and nomadic peoples of the Middle East; emphasis on the Arab world. Prerequisite: Anth 1002. (Fall)

3708 Cultures of Africa (3) Grinker, Lubkemann

Comparative examination of the history, cultural development, and contemporary problems of sub-Saharan African cultures. New World African cultures are also considered. Prerequisite: Anth 1002 or permission of instructor.

3709 Japanese Culture Through Film (3) Hamano

Same as Japn 3162. (Spring)

3801 African Roots from *Australopithecus* to Zimbabwe (3) Brooks

The development and contributions of Africa from human beginnings through medieval states. Topics include human evolution, origins of art, technology, trade, and animal/plant domestication, rise of African states, early relations with Europe and Asia, antecedents of contemporary African diversity. Prerequisite: Anth 1003 or permission of instructor.

3802 Human Cultural Beginnings (3) Brooks

Survey of prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of agriculture. Prerequisite: Anth 1003. (Fall)

3803 Old World Prehistory: First Farmers to First Cities (3) Cline and Staff

Archaeology of the Near East, Egypt, Europe, and other areas, from the beginnings of agriculture to the rise of Babylon. Prerequisite: Anth 1003.

(Spring)

3804 **Origins of the State and Urban Society** (3) Blomster and Staff

Emergence of urbanism and the state in the prehistory of different world regions.

Prerequisite: Anth 1003.

3805 **Archaeology of Israel and Neighboring Lands** (3) Cline

The archaeology of Israel and adjacent areas (Syria, Jordan, Lebanon). Examination of many major sites and monuments. Significant problems and current debates. Same as AH

2106. (Fall)

3806 **Art and Archaeology of the Aegean Bronze Age** (3) Cline

Same as AH 2104.

3811 **Historical Archaeology** (3) Cressey

Survey of the basic data and methods of research in the material culture of recent history. Same as AmSt 3811. (Spring, alternate years)

3812 **Power and Violence in the New World** (3) Blomster

The use of power, violence, and resistance in New World societies, examined through archaeological, ethnohistoric, and ethnographic data.

Specific topic announced in the Schedule of Classes.

3813 **Archaeology of North America** (3) Staff

History of American archaeology; survey of North American culture history from human entry into the Americas during the Pleistocene period until the time of the first European contacts. Focus on peoples north of Mexico. Prerequisite: Anth 1003.

3814 **Ancient Mexican Civilizations (3)**

Blomster

Culture history of pre-Columbian societies in Middle America; the emergence of Mesoamerican civilization from the earliest hunter–gatherers and first farmers to the Aztec Empire. Prerequisite: Anth 1003.

3821 **Myths and Mysteries in Archaeology (3)**

Blomster, Johnston

Topics ranging from King Arthur to Atlantis are used to illustrate how archaeological methods and techniques can falsify—or support—exotic beliefs about the past.

3822 **Archaeology in Film and Television (3)**

Cline and Staff

As visual media increase public awareness of archaeology, misrepresentations and distortions abound. This course examines the relationships among archaeology, the media, and popular culture. Issues considered include nationalism, descendant communities, gender, race, and colonialism.

3823 **Archaeology of Ritual and Religion (3)**

Blomster and Staff

Archaeological and ethnographic examples from around the world are used to critically evaluate how archaeologists make inferences about ritual practices and the religious lives of past peoples. Issues include the origins of symbolic behavior, sacred landscapes, shamanism, ancestor veneration, and sorcery/witchcraft.

3832 **Paleoanthropological Field Program (3 or 6)**

Braun

Field research in paleoanthropology, including excavation methods, identification and analysis of materials, paleoecology, archaeology, and human anatomy. Conducted at selected sites in Eurasia, Africa, or Australia. Visits to comparative sites and collections in the region. (Summer)

3833 **Field Research: New World (1 to 6)**

Blomster

Survey, excavation, and/or laboratory analysis at localities in North or South America.

See Schedule of Classes for details. (Summer)

3834 **Field Research: Old World** (3) Cline

Survey, excavation, and/or laboratory analysis at Neolithic or later localities in

Eurasia, Africa, or Oceania. See Schedule of Classes for details. (Summer)

3835 **Historical Archaeology Field Program** (3) Cressey

Practical experience with a variety of excavation and laboratory techniques in

historical archaeology; specific site and topics announced in the Schedule of Classes. Same as AmSt 3835. (Summer)

3838 **Theory and Practice in Archaeology** (3) Blomster, Braun, and Staff

The primary literature in archaeology theory since the 1960s. Ethics, topical issues, and archaeological practice. Prerequisite: Anth 1003. (Fall)

3839 **Lab Research Methods in Archaeology** (3) Brooks, Blomster, and Staff

Research methods and techniques used by archaeologists. Emphasis on hands-on experience in one or more techniques. Prerequisite: Anth 1003.

(Spring, alternate years)

3891 **Special Topics in Archaeology** (3) Staff

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Prerequisite: Anth 1003 or permission of instructor.

3991 **Special Topics** (3) Staff

Topics announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

3995 Undergraduate Research (arr.)

Staff

Individual research problems to be arranged with a member of the faculty. May be repeated for credit. Prerequisite: permission of instructor.

4008 Seminar: Contemporary Anthropological Theory (3) Lubkemann, Grinker

The development of major trends in anthropological theory. How anthropologists from the four fields—sociocultural, linguistic, biological, and archaeology—have deployed and developed the ideas of theorists in their own empirical research and theorizing about specific processes. Prerequisite: Anth 2008.

APPLIED SCIENCE

Interdepartmental course offerings in the School of Engineering and Applied Science.

1001 Introduction to Engineering for Undeclared Majors (1) Dolling and Staff

As an introduction to disciplines within SEAS, potential solutions to problems are presented by practitioners of civil and environmental engineering; computer science; electrical, computer, and biomedical engineering; mechanical and aerospace engineering; and systems engineering. (Fall)

2057 Analytical Mechanics I (3)

Silva

First half of a one-year sequence. Concepts of statics: force systems, conditions of force and moment equilibrium, simple structures, distributed forces, centroids, internal forces, friction, moments of inertia. Prerequisite or concurrent registration: ApSc 2113, Phys 1021. (Fall and spring)

2058 Analytical Mechanics II (3)

Leftwich and Staff

Second half of a one-year sequence. Concepts of dynamics: kinematics of particles, velocity and acceleration, translating and rotating reference frames, particle dynamics,

motion under central and electromagnetic force, effect of Earth's rotation, vibrations, work, kinetic and potential energy, dynamics of systems of particles. Prerequisite: ApSc

2057. (Fall and spring)

2113 Engineering Analysis I (3)

Haque

Analytical methods for the solution of problems in engineering, the physical sciences, and applied mathematics: applications of ordinary differential equations, matrices and determinants, eigenvalues and eigenvectors, systems of ordinary linear differential equations, Bessel and Legendre functions. Prerequisite or concurrent registration: Math

2233. (Fall and spring)

2114 Engineering Analysis II (3)

Wasyliwskyj and Staff

Analytical methods for the solution of problems in engineering, the physical sciences, and applied mathematics: complex variables, Fourier series and integral, frequency filters, Laplace transforms, inversion and Duhamel integrals; partial differential equations.

Prerequisite: Math 2233.

(Fall and spring)

3115 Engineering Analysis III (3)

Shaw, van Dorp

Analytical methods for the solution of engineering problems using concepts from probability and statistics: probability modeling, random variables and their distributions, mathematical expectation, sampling, point and confidence interval estimation, hypothesis testing, correlation, regression, and engineering applications. Prerequisite: Math 1232; UW

1020. (Spring)

ARABIC

See **Classical and Near Eastern Languages and Civilizations.**

ARCHAEOLOGY

See **Anthropology**.

ART

See **Fine Arts and Art History**.

BIOCHEMISTRY AND MOLECULAR BIOLOGY

The Department of Biochemistry and Molecular Biology in the School of Medicine and Health Sciences offers the following courses that pertain to the secondary field in biochemistry and molecular biology and are available to undergraduates across the University.

3261 Introductory Medical Biochemistry (4)

Same as BiSc 3261. Prerequisite Chem 2151–52. Credit toward the degree cannot be earned for this course and for Chem 3165.

3262 Biochemistry Laboratory (2)

Same as BiSc/Chem 3262. Prerequisite: Bioc/BiSc 3261 or equivalent. Laboratory fee.

3263 Special Topics in Biochemistry (2)

Same as BiSc 3263. Prerequisite: Bioc/BiSc 3261 or equivalent. Credit toward the degree cannot be earned for this course and for Chem 3166.

3560 Diet, Health, and Longevity (3)

Biochemical and molecular explanations of how calorie intake affects health; scientific principles of dieting. Prerequisite: Bioc 3261 or BiSc 1005 or ExSc 2114 or 2119.

3564 Lipid Biotechnology (2)

Same as BiSc/Chem 3564. Prerequisite: Bioc/BiSc 3261 or equivalent. Laboratory fee.

3820 Bioinformatics and Computational Biochemistry (2)

How biomedical researchers integrate information from molecular biology resources for analysis and testing of hypotheses. Prerequisite: BiSc 1111; Stat 1127.

4195 Undergraduate Research (1)

Research conducted under a mentor who is a member of the department. May be repeated for credit (only 1 credit may count toward the secondary field). Prerequisite: permission of the faculty member concerned.

BIOLOGICAL SCIENCES

Professors R.K. Packer, R. Donaldson, D.L. Lipscomb (*Chair*), K.M. Brown, J.M. Clark,

L.C. Smith, G. Hormiga, G. Ortí, R.P. Tollo, K.A. Crandall

Associate Professors H. Merchant, C.A. Forster, P. Hernandez, J.T. Lill, A. Jeremic

Assistant Professors D.W. Morris, H.G. Döbel, I. Eleftherianos, R.A. Pyron, D. O'Halloran,

A. Zanne, S. Powell, A. Smith

Bachelor of Arts with a major in biology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—BiSc 1111–12 or equivalent.
3. Required courses in related areas: Chem 1111–12, 2151–52, and 2153–54. (The following courses are strongly recommended: Phys 1011–12 or 1021–22; 3 credit hours of either mathematics or statistics.)
4. Required courses for the major—A minimum of 24 credit hours of upper-division courses, which must include at least 4 hours from each of the following and at least three courses with laboratory: cell and molecular biology (BiSc 2202–20, 3209–63),

suborganismal and organismal biology (BiSc 2318–40, 3320–25), and ecology and evolution (BiSc 2450–58, 3456–63).

Bachelor of Science with a major in biology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—BiSc 1111–12 or equivalent.
3. Required courses in related areas—Chem 1111–12, 2151–52, and 2153–54; Phys 1011–12 or 1021–22; 3 credit hours of either mathematics or statistics (this requirement cannot be satisfied by waiver). Two years of an approved foreign language are strongly recommended but not required.

4. Required courses for the major—A minimum of 30 credit hours of upper-division courses, which must include at least 4 hours from each of the following and at least three courses with laboratory: cell and molecular biology (BiSc 2202–14, 3209–63), suborganismal and organismal biology (BiSc 2318–40, 3320–25), and ecology and evolution (BiSc 2450–58, 3456–63). A maximum of 6 credit hours of research and independent study in biological sciences may be used as electives within the major.

Combined Bachelor of Science/Master of Science in the field of biological sciences—Interested students should consult their advisor early in the junior year.

Special Honors—In addition to the general requirements stated under University Regulations, in order to be considered for graduation with special honors, a student must maintain a cumulative 3.5 grade-point average in biological sciences courses and at least a 3.0 cumulative overall grade-point average. Students who meet these criteria and wish to pursue special honors must complete an approved research project under faculty direction.

Minor in biology—12 credit hours of upper-division courses (excluding research and independent study).

With permission, graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: BiSc 1111–12 or equivalent is prerequisite to all upper-division courses except by permission of the instructor.

1005 **The Biology of Nutrition and Health** (3) Döbel and Staff

A study of the human body and its disorders and diseases through examination of the essential molecules of life, nutrition, digestion, genetics, and reproduction. For non-majors. Laboratory fee. (Fall)

1006 **The Ecology and Evolution of Organisms** (3) Döbel and Staff

Introduction to ecology and evolution, including man's impact on other plants and animals, and an overview of Earth's biodiversity. For non-majors. Laboratory fee. (Spring)

1111 **Introductory Biology: Cells and Molecules** (4) Brown and Staff

Nutrition and metabolism, cellular and developmental biology, genetics, and molecular biology of plants and animals. Laboratory fee. (Fall)

1112 **Introductory Biology: The Biology of Organisms** (4) Döbel and Staff

Concepts and methods in the study of whole organisms. Evolutionary theory; population biology; diversity of plants, animals, fungi, and microorganisms; ecology and behavior; and animal structure and function. Laboratory fee.

(Spring)

2202 **Cell Biology** (3) Morris and Staff

Structure and function of biological molecules and cellular organelles; cellular interactions. Prerequisite: one semester of organic chemistry.

(Fall and spring)

2207 **Genetics (3)**

Staff

Introduction to genetics, with emphasis on the integration of transmission of genetic traits and the molecular basis of gene action. Also includes cytogenetics, gene regulation, and examples of current applications of genetic technology. (Fall and spring)

2208 **Genetics Laboratory (1)**

Staff

Study of genetic principles and genetic and molecular techniques in *Drosophila* and *E. coli*. Benchwork and comparative genomics using bioinformatics. Prerequisite or concurrent registration: BiSc 2207.

Laboratory fee. (Spring)

2214 **Developmental Biology (4)**

Brown

Lecture (2 hours), laboratory (4 hours). Embryonic development of animals. Principles illustrated by experimental studies of developmental problems. Laboratory exercises involve micromanipulative, biochemical, and molecular studies on animal embryos cultured in the lab. Laboratory fee. (Spring)

2220 **Developmental Neurobiology (3)**

O'Halloran

The molecular mechanisms that guide neural development: events surrounding the birth of neurons, how specific neurons are determined, how neurons find the correct targets, how cell death guides proper neural development and synapses are formed and maintained.

2305 **Plant Biology (3)**

Donaldson

Discussions of plant metabolism and molecular biology: photosynthesis, nitrogen metabolism, membrane transport, mechanisms of hormone action, protein targeting, biotechnology, and current research topics. Prerequisite: Chem 1111–12. (Spring, even years)

2318 **Histology** (4) Staff

Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Laboratory fee. (Spring)

2322 **Human Physiology** (3) Packer

Introduction to the function of organ systems of the human body. Prerequisite: Chem 1111–12. (Fall)

2323 **Human Physiology Laboratory** (1) Staff

Study of basic physiology laboratory techniques; emphasis on the experimental study of homeostatic mechanisms in humans. Prerequisite or concurrent registration: BiSc 2322. Laboratory fee. (Fall)

2330 **Invertebrate Zoology** (4) Lipscomb

Lecture (2 hours), laboratory (4 hours). General survey of invertebrate animals, including classification, morphology, physiology, embryology, and evolutionary relationships among phyla. Laboratory fee. (Fall)

2332 **Comparative Vertebrate Anatomy** (4) Hernandez

Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of Phylum Chordata, stressing recent forms. Laboratory fee.
(Spring)

2337 **Introductory Microbiology** (4) Morris

Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, pathogenesis, and biotechnology.

Antibiotic resistance and emerging diseases. Prerequisite: one year of chemistry. Laboratory fee.

(Fall and spring)

2339 **Parasitology** (4) Hawdon

Lecture (2 hours), laboratory (4 hours). Introduction to animal parasitology; survey of parasitic types from protozoa through arthropods. Laboratory fee.

(Fall)

2340 **Taxonomy of Flowering Plants** (4) Staff

Lecture (2 hours), laboratory and field (4 hours). Origin, evolutionary development, and principles of systematics of flowering plants. Laboratory fee. (Spring)

2450 **Organic Evolution** (3) Lipscomb

Synthetic theory of organic evolution, including population biology, speciation, adaptation, macroevolution, systematics, biogeography, and the geologic record. (Spring)

2451 **History of Life** (3) Forster

Same as Geol 2151.

2452 **Animal Behavior** (3) Staff

An evolutionary approach to the study of animal behavior, emphasizing behavioral ecology and sociobiology. (Spring)

2454 **General Ecology** (4) Powell

Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer and their relationship to the structure and function of population, species, communities, and ecosystems. Laboratory fee. (Fall)

2455 **Plant Ecology** (4) Staff

Lecture (2 hours), laboratory (4 hours). Introduction to the ecology of plant populations, communities, and individuals. Two weekend field trips required. Laboratory fee. (Fall, even years)

2467 **Marine Biology** (3) Staff

Study of relationships between organisms and physical, chemical, and biological factors of the marine environment. Consideration of the open ocean and coastal ecosystems and human influences on them. (Spring)

2458 **Field Botany** (4) Staff

Lecture (2 hours), laboratory and field (4 hours). Field and laboratory studies on vascular plants of the Coastal Plain, Piedmont, and mountains of the mid-Atlantic States. Two weekend field trips required. Laboratory fee.
(Fall, odd years)

Laboratory fee. Same as Geol 2159. (Spring, odd years)

2580 **Biotechnology** (3) Morris

Genetic engineering of bacteria, plants, and animals, including humans. Applications of modern biotechnology, especially in the field of medical biotechnology, such as gene therapy, xenotransplantation, and the Human Genome Project. Regulation, prospects, and

social impact of biotechnology. Recommended: BiSc 2202 or 2207. Prerequisite: organic chemistry.

(Fall and spring)

2581 **Human Gross Anatomy** (3)

Walsh, Slaby, Bohn

The structural organization of the human body and how it relates to regional and systems-based functions. Emphasis on the macroscopic structure of the body. Same as Anat 2181. (Spring)

2583 **Biology of Proteins** (3)

Donaldson

About half of the proteins in the human genome have unknown functions. Are some related to cancers, muscle degeneration, infectious disease? How can evolutionary relationships among proteins from other organisms help us discover functions of unknown proteins? Laboratory fee. Prerequisite: AP or IB Biology or Chemistry. (Fall)

2584 **Introduction to Bioinformatics** (3)

Staff

An introduction to the use of computational techniques in molecular biology, genetics, and evolution. Techniques and software for database searching, sequence alignment, gene finding, phylogenetics, genomics, and proteomics. Same as CSci 3571. (Spring)

3209 **Molecular Biology** (4)

Eleftherianos

Overview of theories, techniques, and procedures associated with molecular biology; topics include the biosynthesis of DNA, RNA, and proteins, relationships among structure, function, and expression; and traditional and modern methods of gene and protein characterization and monitoring. Prerequisite: Chem 1111–12. Laboratory fee. (Fall)

3210 **Nanobiotechnology** (3)

Jeremic

Theory and application of nanotechnologies in biology and medicine. Strategies for studying the organization, function, and complexity of biological systems at nm scale. Several areas of research are covered, including high-resolution cellular and molecular imaging, spectroscopy, and optical tweezers. Prerequisite: BiSc 2202 or 3261 or permission of instructor. (Spring)

3211 **Nanobiotechnology Laboratory** (1) Jeremic

Overview of techniques and approaches to studying complex biological interactions at nm scale. Prerequisite: BiSc 3210 or permission of instructor. Laboratory fee. (Spring, even years)

3212 **Immunology** (3) Smith

Introduction to mammalian immunology covering the progression of immune responses from initial pathogen contact to immune memory. Applied topics include autoimmunity, transplantation, and the effects of HIV on the immune system. Prerequisite: BiSc 2202 and one semester of organic chemistry; BiSc 2207 or 2322 recommended. (Fall)

3213 **Applied Immunology** (3) Nolan

Overview of current immunologically relevant topics, including autoimmunity, transplantation, cancer, HIV, allergy, vaccines, and immunologically based diagnostics. Prerequisite: BiSc 3212.

3261 **Introductory Medical Biochemistry** (4) Vanderhoek

Introduction to structures of biological macromolecules, enzyme catalysis, cellular bioenergetics, and metabolism. Prerequisite: Chem 2151–52. Same as Bioc 3261. Credit toward the degree cannot be earned for this course and for Chem 3165. (Fall)

3262 Biochemistry Laboratory (2)

Vanderhoek

Study of common experimental techniques used in life science laboratories to separate and characterize biological macromolecules. Prerequisite: BiSc 3261 or equivalent.

Laboratory fee. Same as Bioc/Chem 3262. (Spring)

3263 Special Topics in Biochemistry (2)

Staff

In-depth discussion of current biochemically relevant topics, including cancer and HIV chemotherapy, immune response, photosynthesis, signal transduction, hormone regulation and nutrition. Topics vary. Prerequisite: BiSc 3261 or equivalent. Same as Bioc 3263. Credit toward the degree cannot be earned for this course and for Chem 3166. (Spring)

3320 Human Neurobiology (3)

Jeremic

Introduction to the function of the human nervous system, gross and microscopic structure, and neurophysiology of the brain, spinal cord, and nerves; alterations caused by disease or injury. Prerequisite: BiSc 2202 or 3261. (Fall)

3321 Comparative Endocrinology (3)

Nolan

Basic principles of chemical integration, neuroendocrine relationships, and mechanisms of hormone action. Prerequisite: BiSc 2318 or 2322. (Spring)

3325 Environmental Physiology (3)

Packer

Mechanisms of evolutionary adaptation and processes of acclimation by which animals respond to environmental challenges; emphasis on vertebrates. (Spring)

3456 Animal Ecology (4)

Merchant

Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: BiSc 2454 or permission of instructor. Laboratory fee.

(Spring, even years)

3457 **Aquatic Ecology** (4) Merchant

Lecture (3 hours), laboratory and field (3 hours). Ecological principles applied to aquatic systems with special references to physiochemical properties, typical habitats, and communities. Laboratory fee.

(Spring, odd years)

3458 **Plant Comparative Structure and Function** (3) Zanne

Fundamental principles of how organisms are built, investigating trade-offs and coordination in design, how variation in structure influences physiological function in different ecological settings, and how relations among plants shape structure and function and responses to ecological gradients. (Spring)

3460 **Conservation Biology** (3) Lill

Theory and practice of conserving biological diversity. Ecological patterns of biodiversity, biology of small populations, and conservation case studies. Use of ecological modeling software to explore various topics. Prerequisite: BiSc 2454 or permission of instructor. (Spring)

3461 **Plant–Animal Interactions** (3) Lill

Review of the major ecological and evolutionary interactions that occur between plants and animals in natural and managed ecosystems. BiSc 2450 or BiSc 2454 recommended. (Fall, even years)

3462 **Plant–Animal Interactions Laboratory (1)** Lill

Field and laboratory study of temperate interactions between plants and animals. Group projects focus on original data collection, analysis, and interpretation. Prerequisite or concurrent registration: BiSc 3461. Laboratory fee. (Fall, even years)

3463 **Ecological and Evolutionary Genetics (3)** Staff

An analysis of the ecological and genetic basis of evolutionary change. Topics include the organization and maintenance of genetic variation within and among natural populations, the genetic basis of complex traits, molecular ecology analyses, and genotype by environment interactions. Prerequisite: BiSc 2450 or permission of instructor. (Fall)

3564 **Lipid Biotechnology (2)** Vanderhoek

Prerequisite: Bioc/BiSc 3261 or Chem 3165. Laboratory fee. Same as Bioc/Chem 3564.

4171 **Undergraduate Research (arr.)** Staff

Admission by permission of the staff member concerned. May be repeated for credit. Prerequisite: Chem 2152; 16 credit hours in biological science courses. Laboratory fee. (Fall and spring)

4172 **Independent Study (1 to 3)** Staff

Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

BUSINESS ADMINISTRATION

Requirements for the Bachelor of Business Administration degree are listed under the School of Business. The courses listed below form the majority of the business core for the

B.B.A. degree. Several of the courses are required in the B.Accy. degree program as well. BAdm courses are taught by faculty members schoolwide.

Note: BAdm 3101, 3401, 3501, and 3601 are restricted to students in the School of Business.

1001–2 **First-Year Development Course** (0.5 each) Besnainou and Staff

Required of all first-year students in School of Business. This two-semester course is designed to enhance students' education and begin preparation for business careers. The course meets periodically during the semester. Course fee. Restricted to students in the first year of enrollment in School of Business.

1101 **Organizational Behavior** (3) Bailey, Hill, Cohen

Introduction to concepts of psychology and the social dynamics that characterize organizations. Decision making, motivation, attitudes, teamwork, power, and leadership. An experiential laboratory component uses case discussions and exercises to illustrate applications of theory and concepts. Restricted to School of Business freshmen. (Fall and spring)

2003 **Analysis of Business Issues** (3) Staff

Restricted to School of Business students in their sophomore year. Introduction to common language and analytic techniques. Business concepts and information resources are introduced through case analysis focusing on written and verbal communication and critical thinking skills.

2101 **Management, Organizations, and Society** (1.5) Davis, Forrer

Introduction to the manager and the management process in the context of organizations and society. Focus on effective management of the corporation in a changing society. (Fall and spring)

2201 **International Financial Environment** (1.5) Rehman, Yang, Click

Assessment of international economic and financial environments as they affect international corporate activity. Conceptual issues and current developments in the international financial environment, including an overview of international economic systems, international financial systems, and global financial markets. Prerequisite: Econ 1012. (Fall and spring)

2301 **Management Information Systems Technology** (3) Granger, Duan, Dasgupta

An introduction to data and information processing concepts and systems viewed from a contemporary management perspective. Emphasis on uses and applications as well as emerging managerial issues with the potential to reshape the form and function of information systems. Lab required. Prerequisite: basic knowledge of Microsoft Word, Excel, and PowerPoint. (Fall and spring)

3001 **Career Management Strategies** (1) Besnainou and Staff

Restricted to School of Business students in their junior year. The career development process, including job search strategies and formulation of a career management plan, with practice in producing a resume and interviewing for a position.

3101 **Human Resource Management** (3) McHugh

Global and strategic implications of human capital policies and practices, including human resource planning, recruitment, selection, training, development, compensation, and collective bargaining. Prerequisite: Econ 1012. (Fall, spring, and summer)

3102 **Business and Government Relations (3)** Rivera, Beales, Kim

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. Restricted to juniors and seniors in the B.B.A., B.Accy., and SEAS business concentration programs. (Fall and spring)

3401 **Basic Marketing Management (3)** Liebrenz-Himes, Rau

Consumer and organizational buying behavior. Strategic marketing processes (market research, segmentation, targeting, positioning, and relationship-building). Product development and brand management, valuation and pricing, channel and logistics management, integrated marketing communications, e-commerce. Prerequisite: Econ 1012; Stat 1051 or 1053. (Fall, spring, and summer)

3501 **Financial Management and Markets (3)** Klock, Jostova

Introduction to financial markets, investment analysis, and financial management. Financial analysis, risk management, working capital management, capital budgeting, financial structure, cost of capital, and dividend policy. Prerequisite: Accy 2001; Econ 1012; Math 1051, 1252; Stat 1051 or 1053. (Fall and spring)

3601 **Operations Management (3)** Perry, Bagchi, Matta, Altug, Glickman

Production planning concepts and analytical tools. Designing and managing production processes: facilities, equipment, process control systems. Design issues, demand forecasting, material planning, acquisition techniques. Managing the factory floor:

scheduling, total quality management, continuous improvement concepts and methods.

Prerequisite: Stat 1051. (Fall and spring)

4101 Business Law and Ethics (3)

Fort, Martin

Overview of the American legal system and related ethical issues with reference to business law and the Universal Commercial Code. Key legal concepts such as contracts and torts. The role of courts: regulation, litigation, and constitution issues. (Fall and spring)

4801 Strategy Formulation and Implementation (3)

Thurman, Cook, Walter

An integrative capstone course to develop skills in diagnosing organizational problems, formulating and selecting strategic alternatives, and recognizing problems inherent in strategy implementation. Restricted to seniors in the B.B.A., B.Accy., and SEAS business concentration programs.

(Fall and spring)

4900 Special Topics (1 to 3)

Staff

Experimental offering; new course topics and teaching methods.

4950 Internship (0)

School of Business undergraduates may register for this course when they wish to have an internship recorded on the transcript. The supervisor must verify that the internship has been completed for a minimum of six hours per week. An administrative fee is charged. May be repeated each semester if desired.

4995 Independent Study (1 to 6)

Staff

Assigned topics with interdisciplinary focus. Admission by prior permission of advisor. May be repeated once for credit but in a separate semester.

CHEMISTRY

Professors M. King (*Chair*), J.H. Miller, A. Vertes, S. Licht, J.A. Tossell (*Research*), C.L.

Cahill

Associate Professors M.J. Wagner, H.H. Teng, V. Sadtschenko, M.A. Massiah, M.G.

Zysmilich

Assistant Professors C.S. Dowd, S. Gillmor, A.M. Voutchkova, H. Chen, S.R. Daly, L.M.

McClary

Professorial Lecturers C. Woytowicz, E. Libelo

Bachelor of Arts or Bachelor of Science with a major in chemistry—The department offers four undergraduate majors, all designed to give students a broad background in the basic divisions of chemistry: analytical, biochemistry, inorganic, organic, and physical. Major I permits a wider selection of electives to meet the needs of students preparing to enter medicine, dentistry, law, or related fields. Major II is for students preparing for graduate study in chemistry or those planning to enter the chemical profession and wishing to be certified by the American Chemical Society as having met the minimum requirements for professional training. Major III is in forensic chemistry, preparing students to meet the needs of federal and state forensic sciences laboratories. Major IV fulfills the American Chemical Society requirement for a certified degree program in chemistry with a biochemistry option.

The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses for the Bachelor of Arts degree for all majors—Chem 1111–12; Chem 2122 and 2123; Math 1231 and 1232; Phys 1021–22. Majors intending a

Bachelor of Science degree must take two additional semesters of approved course work in the natural sciences or mathematics, such as BiSc 1111–12 or Geol 1001 and 1005.

3. (a) Required courses for Major I—Chem 2151–52, 2153–54, 3171–72, 3173, 3165, 4122, 4134.

(b) Required courses for Major II—Chem 2151–52, 2153–54, 3171–72, 3173, 3165, 4122, 4123, 4134, 4195 (for a total of 3 credits). A course in a structured computer programming language, such as Stat 1129 or CSci 1011, 1041, 1121, or 1131, is recommended.

(c) Required courses for Major III—Chem 2151–52, 2153–54, 3171–72, 3173, 3165, 4122, 4134; BiSc 1111–12; ForS 6211, 6221, and three courses from ForS 6206, 6234, 6235, 6238, 6239, 6240.

(d) Required courses for Major IV—Chem 2151–52, 2153–54, 3171–72, 3173, 3165–66, 3262, 4122, 4123, 4134, 4195; BiSc 1111–12. BiSc 2202, 2207, and 2322 are recommended. Bioc/BiSc equivalents of Chem 3165–66 and 3262 may be substituted.

An entering student who is considering chemistry as a major should consult a department advisor regarding the program of study for the first two years. In general, the following sequence of courses is recommended for those students considering Major II: first year—Chem 1111–12, Math 1231 and 1232 (or 1220–21 if necessary); second year—Chem 2122, 2151–52, and 2153–54, Phys 1021–22, Math 1232 if not taken in first year; third year—Chem 2123, 3171–72, 3173; fourth year—Chem 3165, 4122, 4123, 4134 (if not taken in the junior year), 4195. Students in Majors I, III, and IV should follow this sequence in general and are urged to consult with the chemistry and premedical advisors concerning their academic programs.

Special Honors—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in chemistry must maintain a cumulative 3.0 grade-point average in chemistry courses and take Chem 4195 for at least 3 credits over two semesters. In addition to the final report for Chem 4195, a poster or oral presentation is required.

Combined Bachelor of Science with a major in chemistry/Master of Forensic Sciences with a concentration in forensic chemistry—A program leading to the B.S. in the field of chemistry and M.F.S. with a concentration in forensic chemistry is available. Interested students should consult the Chemistry Department in the sophomore year.

Minor in chemistry—Required: Chem 1111–12, 2122, 2123, 2151–52, 2153–54, and one course chosen from Chem 3170, 3171, 3165, or 4134.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

PHYSICAL SCIENCE

1003–4 **Contemporary Science for Nonscience Majors** (3–3) Zysmilich and Staff

Contemporary topics in physical, biological, and medical science. Chem 1003 is not prerequisite to Chem 1004. Laboratory fee. (Academic year)

CHEMISTRY

1111–12 **General Chemistry** (4–4) Cahill, Miller, Gillmor, McClary, Daly

Atomic structure and properties; stoichiometry; gas, liquid, and solid state; chemical bonding; solutions; chemical kinetics and equilibria; thermodynamics; acids and bases; electrochemistry; descriptive chemistry. Prerequisite to Chem 1111: one year of high school

algebra. Prerequisite to Chem 1112: Chem 1111. Laboratory fee. (Chem 1111 and 1112—fall and spring)

2085 **Environmental Chemistry** (3) Miller, Libelo

Chemistry and physics of the environment, with emphasis on water and air pollution; environmental analysis and modeling and their limitations. (Fall)

2122 **Introductory Quantitative Analysis** (3) Licht, Vertes

Theory and practice of quantitative analysis by modern methods; evaluation of analytical data emphasizing detection and correction of experimental errors. Correlated with Chem 2123. Prerequisite: Chem 1112. (Spring)

2123 **Introductory Quantitative Analysis Laboratory** (1) Staff

Laboratory complement to Chem 2122. Prerequisite or concurrent registration: Chem 2122. Laboratory fee. (Fall and spring)

2151–52 **Organic Chemistry** (3–3) King, Dowd, Voutchkova, and Staff

Systematic treatment of the structure, preparation, properties, and reactions of the principal classes of organic compounds. Fundamental principles of stereochemistry, reaction mechanisms, and spectroscopic methods of analysis. Prerequisite to Chem 2151: Chem 1112. Prerequisite to Chem 2152: Chem 2151. (Academic year)

2153–54 **Organic Chemistry Laboratory** (1–1) King and Staff

Laboratory complement of Chem 2151–52. Introduction to and practice in basic skills of synthesis, separation, purification, and identification of organic compounds. Prerequisite or concurrent registration: Chem 2151–52. Prerequisite to Chem 2154: Chem 2153.

Laboratory fee. (Academic year)

3140 **Geochemistry** (3) Teng

Same as Geol 3140.

3165–66 Biochemistry I–II (3–3)

Massiah

Introduction to the chemistry of living cells; structure and function of proteins, lipids, carbohydrates, and nucleic acids; enzyme structure, mechanism, and regulation.

Prerequisite: Chem 2151–52; Chem 3165 is prerequisite to Chem 3166. Credit toward the degree cannot be earned for Chem 3165–66 and for Bioc/BiSc 3261 and 3263. (Academic year)

3170 Introduction to Physical Chemistry (3)

Gillmor

Thermodynamics, chemical and physical equilibria, kinetics, and spectroscopy.

Examples taken from biological systems. Prerequisite: Chem 1111–12; Math 1231; Phys 1012 or 1022; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 3171–72 or an equivalent course. (Fall)

3171–72 Physical Chemistry (3–3)

Wagner, Miller, Chen

Gas laws, chemical thermodynamics, chemical equilibrium, kinetics, quantum chemistry, atomic and molecular spectra, structure of solids, liquids, and macromolecules.

Prerequisite to Chem 3171: Chem 1112; Math 1231; Phys 1022; or permission of instructor.

Prerequisite to Chem 3172: Chem 3171. (Academic year)

3173 Physical Chemistry Laboratory (2)

Miller, Wagner, Gillmor

Laboratory complement to Chem 3171. Prerequisite or concurrent registration: Chem 2123, 3171. Laboratory fee. (Spring)

3262 Biochemistry Laboratory (2)

Vanderhoek

Prerequisite: Chem 3165 or Bioc/BiSc 3261. Laboratory fee. Same as Bioc/BiSc

3262. (Spring)

3564 Lipid Biotechnology (2)

Vanderhoek

Prerequisite: Chem 3165 or Bioc/BiSc 3261. Laboratory fee. Same as Bioc/Chem

3564.

4113 Chemical Instrumentation (3)

Staff

Electronic analog measurements and control of electrical quantities in chemical instrumentation; digital and analog data conversion and optimization of electronic measurements in chemical instrumentation; computer interfacing and programming using PC-based systems. Prerequisite: Chem 3172 and 4122. Laboratory fee. (Fall)

4122 Instrumental Analytical Chemistry (3)

Vertes

Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, with emphasis on atomic and molecular spectrophotometry, infrared spectroscopy, nuclear magnetic resonance, mass spectrometry, chromatography, and electroanalysis. Correlated with Chem 4123. Prerequisite or concurrent registration: Chem 3171 or permission of instructor. (Fall)

4123 Instrumental Analytical Chemistry Laboratory (2) Wagner, Sadtschenko

Laboratory complement to Chem 4122. Prerequisite or concurrent registration: Chem 3171 and 4122. Laboratory fee. (Fall)

4134 Descriptive Inorganic Chemistry (3)

Cahill, Daly

Emphasis on periodic trends and structure and reactivity of transitional metal complexes. Prerequisite: Chem 2122. (Spring)

4195 Undergraduate Research (1 or 2)

Staff

Research on problems approved by the staff. Approval must be obtained prior to registration. A final written report on the work is required. For students requesting Special Honors in chemistry, a poster or oral presentation is also required. May be repeated for credit. Majors are encouraged to take the course for two semesters. Laboratory fee. (Fall and spring)

CHINESE

See **East Asian Languages and Literatures**.

CIVIL AND ENVIRONMENTAL ENGINEERING

Professors M.I. Haque, K.H. Digges (*Research*), A. Eskandarian, K. Roddis, M.T. Manzari (*Chair*), R. Riffat, S. Lerman

Associate Professors C.D. Kan (*Research*), S.S. Badie, P.F. Silva

Assistant Professors D. Marzougui (*Research*), S.H. Hamdar, T. Li, L. Farhadi

Professorial Lecturers B. Whang, M.O. Critchfield, G.C. Everstine, K. Garrahan, F. Sadek

See the School of Engineering and Applied Science for the programs of study leading to the Bachelor of Science with a major in civil engineering.

1010 Introduction to Civil and Environmental Engineering (1) Roddis

An introduction to the profession of civil and environmental engineering. Field visits and laboratory exercises complement classroom instruction. (Fall)

1020 Introduction to a Sustainable World (1) Hamdar, Eskandarian

The science underlying the basic processes that gave rise to the world we live in and that maintain its viability for human life. Ecosystem-functioning environmental issues, such as greenhouse gas emission and ozone, with current efforts to resolve them. Technological innovations in the context of sustainability. (Spring)

2210 Engineering Computations (3)

Hamdar

Numerical methods for engineering applications. Methods for solving systems of linear equations, root finding, curve fitting, and data approximation. Numerical differentiation and integration and numerical solution of differential equations. Computer applications. Prerequisite: CSci 1041, ApSc 2113. (Spring)

2220 Introduction to the Mechanics of Solids (3)

Haque, Eskandarian

Stress and strain, axial load problems, torsion, shear force and bending moment, pure bending of beams, shearing stresses in beams, compound stresses, analysis of plane stress and plane strain, combined stresses, deflection of beams, statically indeterminate problems, columns, energy methods. Prerequisite: ApSc 2057, 2113. (Fall and spring)

2510 Environmental Sustainability (3)

Riffat

An introduction to environmental sustainability with focus on the nexus of water, energy, and climate; energy demands of water systems, water footprints of energy generation, and how the two valuable resources are limiting each other; technologies and research frontiers toward a sustainable water and energy supply. (Fall)

2710 Introduction to Transportation Engineering (3)

Eskandarian, Hamdar

Transportation system components; roadway traffic capacity and network performance measures; signalized and unsignalized intersections; monitoring techniques, instruments, and data processing. Sustainability issues and environmental impact of transportation systems with focus on urban design, planning, and regulation. Prerequisite: Math 2233. (Spring)

3110 Civil Engineering Materials (2)

Haque, Silva, Li

Mechanical properties and behavior of civil engineering materials such as metals, concrete, and fiber-reinforced polymer composites. Properties range from plastic deformations of metallic materials to crushing of confined and unconfined concrete. Basis of the strength of materials. Concepts of creep, fatigue, fracture, and crack propagation.

Prerequisite or corequisite: CE 2220. (Fall)

3111 Civil Engineering Materials Laboratory (1) Silva, Haque, Li

Measurement of stress–strain characteristics and study of failure modes in ductile steel, brittle concrete, and anisotropic composite materials. Experiments include data collection, data analysis, and interpretation and presentation of results regarding tension, compression, bending, impact, and shear properties. Prerequisite or corequisite: CE

3110. (Fall)

3140 Sustainability in Engineering Materials (2) Silva, Li

Sustainable engineering: overall materials energy needs/properties and impacts; load resistance and aging, thermodynamics, water conservation, heat transfer, use of energy-efficient materials in construction, life-cycle assessment. Prerequisite: CE 3110,

3111. (Spring)

3230 Structural Theory I (3) Manzari, Badie

Theory of statically determinate structures; stability and determinacy; influence lines and moving loads. Analysis of beams, frames, trusses, and arches. Calculation of deflections. Prerequisite: CE 2220. (Fall)

3240 Structural Theory II (3) Manzari and Staff

Theory of statically indeterminate structures using matrix methods and classical approaches such as moment distribution and slope-deflection; influence lines; energy methods. Prerequisite: CE 3230. (Spring)

3310 **Reinforced Concrete Structures (3)** Badie

Properties of concrete and reinforcement; design of flexural reinforcement, shear reinforcement; development of reinforcement; design of columns, floor slabs; ethics and professionalism in design. A design project, including the use of computer software and a detailed report, is required. Prerequisite or corequisite: CE 3240. (Spring)

3520 **Environmental Engineering I:
Water Resources and Water Quality (3)** Riffat

Physical and chemical analyses of water quality and characteristics. Microbiology of water and pathogens. Introduction to water treatment processes involving coagulation, flocculation, filtration, and disinfection. Prerequisite or corequisite: CE 3610. (Spring)

3521 **Environmental Engineering Laboratory (1)** Riffat and Staff

Laboratory experiments for physical and chemical analyses of water and wastewater. Measurement of turbidity, alkalinity, dissolved oxygen, BOD, COD, suspended solids, and optimum coagulant dose using jar tests. Corequisite: CE 3520. (Spring)

3610 **Hydraulics (3)** Staff

Fluid statics: pressure forces, buoyancy, and flotation. Application of kinematic principles; flow fields, stream tubes, and flow nets. Fluid dynamics: applications to pipe flow, hydraulic models, measurement of pressure, and velocity. Open channel flow: applications to water resources engineering. Prerequisite: MAE 3126. (Spring)

3611 **Hydraulics Laboratory (1)** Staff

Laboratory experiments and demonstrations of hydraulics in pipe and open-channel flow. Topics include center of pressure, floating bodies, Bernoulli's theorem, discharge coefficients, velocity profile, and head losses. Prerequisite or corequisite: CE

3610. (Spring)

3720 Highway Engineering and Design (3) Eskandarian, Hamdar

Road vehicle performance. Principles of highway design: horizontal and vertical alignments, roadside design; drainage and drainage structures, earthwork, intersections, interchanges, parking facilities; basic traffic models; highway materials. Application of safety standards. Prerequisite: Math 2233; prerequisite or corequisite: ApSc 3115 and CE

2220. (Fall)

3730 Sustainable Urban Planning Dynamics (3) Hamdar, Eskandarian

Human and physical processes shaping urban environments; human-environment interactions in the context of an urban region; urban design, materials, transport, planning, and regulation. Prerequisite: CE 2710. (Fall)

4320 Metal Structures (3) Roddis

Principles of the design of metal structures, structural elements, connections, specific problems of analysis including the use of computer software, methods of construction, professionalism in design. Prerequisite: CE 3240. (Fall)

4330 Contracts and Specifications (2) Manzari and Staff

Law of contracts, construction contracts, specifications, bidding, insurance and bonds, professional liability, arbitration of disputes, litigation. Prerequisite: junior standing. (Spring)

4340 Design and Cost Analysis of Manzari, Badie, Silva

Civil Engineering Structures (3)

Total structural systems concepts. Design of civil engineering structures such as piers, wharves, bulkheads, offshore platforms, dams, and other special structures. Principles of cost analysis for timber, steel, and reinforced concrete structures. Project and report are required. Prerequisite: senior status. (Spring)

4410 Introduction to Geotechnical Engineering (3) Manzari and Staff

Soils and rock formation, soil composition, permeability, seepage and flow netanalysis, stresses in soil medium, consolidation and settlement, shear strength of soil, analysis of lateral earth pressures, soil compaction. Prerequisite: CE 2220, MAE 3126. (Fall)

4411 Geotechnical Engineering Laboratory (1) Manzari and Staff

Laboratory experiments to evaluate liquid and plastic limits, grain-size distribution, shear strength, compressibility, permeability, and moisture–density relationship of soils. Prerequisite or corequisite: CE 4410. (Fall)

4450 Introduction to Geo-environmental Engineering (3) Manzari

Characterization of soils and wastes, engineering properties of soils and geo-synthetics, fundamental concepts of fate and transport of contaminants, common practice in design and construction of waste containment systems, current methods for remediation of contaminated groundwater and soils. Prerequisite: CE 3520, 4410. (Spring)

4530 Environmental Engineering II: Riffat

Water Supply and Pollution Control (3)

Introduction to wastewater treatment systems including clarification, suspended and attached growth processes. Use of dissolved oxygen models. Water supply and wastewater

collection systems, applied hydraulics of pipelines and pumps. Planning to meet quality needs and regulatory requirements. Prerequisite: CE 3520. (Fall)

4620 Hydrology and Hydraulic Design (3) Haque and Staff

Descriptive hydrology: hydrologic cycle, precipitation, stream flow, evaporation, and transpiration. Quantitative hydrology: hydrograph analysis, hydrographs of basin outflow, storage routing. Probability concepts in hydrology: flood frequency, rainfall frequency, stochastic hydrology. Culverts and stilling basins. Prerequisite or corequisite: ApSc 3115, CE 3610. (Fall)

4810 Research (1 to 3) Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

4820 Special Topics (1 to 6) Staff

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

CLASSICAL AND NEAR EASTERN LANGUAGES AND CIVILIZATIONS

Professors E.A. Fisher, E.H. Cline (*Chair*)

Associate Professors M. Esseesy, A. Bonnah (*Teaching*)

Assistant Professors M.D. Ticktin, E.A. Friedland, A.M. Smith II, P. Minuchehr, S.

Loomis, C. Jorgensen, J.J. Tobkin (*Teaching*)

Teaching Instructors S. Marcus, N. Taher, M.M. Kassab, E. Oraby

Bachelor of Arts with a major in classical studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Classical language proficiency: Students must demonstrate proficiency either in one classical language (Greek or Latin) through the 2002 level or in one classical language through the 2001 level and in the other through the 1002 level. Placement into Greek or Latin above the 1001 level is based on the placement exam offered by the Language Center. Students who have scored a 4 or 5 on the AP Exam for Latin or who place into 3001 or higher in Greek or Latin must still take at least one classical language course at GW or at an approved program.

3. The major consists of 11 courses. Required: Clas 2112, 2113, and either AH 3101 or 3102 or a related course approved by the departmental advisor; four are chosen from group (a), including at least two at the 3000 or 4000 level, and four courses from either groups (a) or (b) as follows. In all cases, cross-listed courses may be substituted (e.g., Clas/Hist 2803). Courses cannot be double-counted across categories.

- (a) Clas 2104 through 2107 and 2803 through 4901; Grek 3101, 3102; Latn 3101, 3102.

- (b) Anth 2601, 3805, 3806, 3834; AH 3101, 3102, 3111; Phil 2111; PSc 2105; Rel 3341.

Bachelor of Arts with a major in Arabic studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. 57–58 credits spanning four years of study, including one semester of study abroad in an Arabic-speaking country.

(a) Language Study: 26–27 credits taken over at least five semesters, including *either* Arab 1001–2, 2001–2, 3001, 3301, and 3302 *or* Arab 1201–2, 2201–3201, and 3202.

(b) Literature: Arab 4001, 4002 (6 credits)

(c) Translation/Interpretation: Arab 4501, 4502 (4 credits)

(d) Linguistics/Culture: three courses selected from Arab 3501, 3502, 3503, and Ling 2601 (9 credits)

(e) Study Abroad: 12 credits, including a minimum of 6 credits in an Arabic dialect, taken at a program in a country in which Arabic is natively spoken.

(f) Exit Proficiency Exam: Majors must pass an exit proficiency exam at the Advanced High level of the ACTFL Guidelines in reading, writing, speaking, and listening.

Special Honors—In addition to the general requirements stated under University Regulations, in order to be considered for graduation with Special Honors, a student must (1) have attained a 3.7 grade-point average in the major and at least a 3.25 average overall by the end of the junior year, and (2) no later than the beginning of the senior year consult a departmental faculty member about a research project to be prepared under the supervision of that faculty member through Clas 3901–4901. Only if a committee of two faculty members approves the completed project will Special Honors be recommended; the research project must be graded *A* or *A–*.

Minor in classical studies—Required: Latn or Grek 1001–2 and five additional courses selected from Latn or Grek 2001–2, 3001, 3002; Clas 2104 through 4901; Anth 3805, 3806, 3834; AH 3101, 3102. In all cases, cross-listed courses may be substituted (e.g., Clas/Hist 2112).

Minor in Arabic studies—Prerequisite: Arab 1001–2 or equivalent. The 21-credit minor consists of Arab 2001–2, 3001, 3201, and 3302. One elective is chosen from Arab 3501, 3502, and 3503.

Minor in Arabic and Hebrew languages and cultures—The student chooses the minor with either an Arabic focus or a Hebrew focus. The minor consists of 15 credits in addition to prerequisite language study or demonstrated competence through the fourth semester (Arab 2002 or Hebr 2002) in the primary focus and through the second semester (Arab 1002 or Hebr 1002) in the other focus. Depending upon the focus chosen, the student completes either Arab 3001, 3301, and 3302 or Hebr 3001, 3301, and 3302, plus two courses chosen from Clas 3101, 3102, 3201, 3202, with at least one course in the student's chosen focus.

ARABIC

1001–2 **Beginning Arabic I–II (4–4)** Staff

Fundamentals of speaking, understanding, reading, and writing of Modern Standard Arabic.

1201–2 **Intensive Elementary Arabic I–II (6–6)** Staff

Fundamentals of speaking, understanding, reading, and writing of Modern Arabic.

Arab 1201 is prerequisite to Arab 1202. Laboratory fee.

2001–2 **Intermediate Arabic I–II (4–4)** Staff

Continuation of Arab 1001–2. Further development of speaking, understanding, reading, and writing skills of Modern Standard Arabic. Prerequisite: Arab 1001–2 or equivalent. Laboratory fee.

2201 **Intensive Intermediate/Advanced Arabic I–II (6–6)** Staff

–3201 Continuation of Arab 1201–2. Arab 1202 is prerequisite to Arab 2201; Arab 2201 is prerequisite to Arab 3201. Laboratory fee.

3001 **Advanced Arabic** (4) Staff

Emphasis on development of speaking skills at the advanced level of proficiency.

Discussion of cultural and social issues based on a selection of contemporary written and audiovisual materials from Arab media sources. Prerequisite: Arab 2002 or permission of instructor. Laboratory fee.

3105 **Special Topics** (3) Staff

Topic announced in the Schedule of Classes may be repeated for credit provided the topic differs.

3301 **Modern Arabic Literature** (3) Staff

Short stories, short plays, poems, formal speeches, and panel discussions in Modern Standard Arabic, with attention to linguistic and stylistic aspects. Prerequisite: Arab 3001 or equivalent and permission of instructor.

3302 **Media Arabic** (3) Staff

Authentic scripted and audiovisual materials from various contemporary Arab media outlets including television and radio newscast and cultural programs; newspaper and magazine articles; films and documentaries; and the Internet. Prerequisite: Arab 3001 or 3301 or permission of instructor.

3311 **Business Arabic** (3) Staff

General and specific business language skills used in a variety of business operations and settings, such as making presentations, researching opportunities, conducting interviews, and negotiating. Prerequisite: Arab 3001.

3501 Arabic and Arab Identity (3)

Esseesy

History of the Arabic language from pre-Islamic times and its subsequent spread into contiguous regions. The role of the Arabic language in formulating the ideology of Arab nationalism and identity. Course is conducted in English.

3502 Arab Film and Culture (3)

Esseesy

Historical survey of Arab cinema and its expression of Arab culture. Course is conducted in English.

3503 Fundamentals of Arabic Linguistics (3)

Staff

Introduction to the structures, functions, and varieties of Arabic from a descriptive linguistics perspective. The history of the language, including contributions of major medieval Arabic grammarians. Analysis of standard and dialectal varieties of Arabic. Course is conducted in English.

4001 Genres in Modern Arabic Literature (3)

Staff

Historical development of short Arabic stories or short Arabic plays throughout the twentieth century. Prerequisite: Arab 3301 or permission of instructor.

4002 Arabic Narratives Through the Ages (3)

Staff

Reading and discussion of narratives, such as those found in stories of *The Thousand and One Nights*, or travel adventures, such as those of Ibn Battuta and his successors. Prerequisite: Arab 3301 or permission of instructor.

4501 Arabic–English Translation (3)

Staff

Theoretical background and practical applications of translation strategies from Arabic to English that are necessary for professional translation tasks. Prerequisite: Arab 3301 or 3302.

4502 **Arabic–English Advanced Translation and Editing** (1 to 3) Staff

The professional translation and editing of various types of material. Prerequisite:
Arab 4501.

GREEK

1001–2 **Beginning Classical Greek** (4–4) Staff

Study of the grammar, vocabulary, and structure of ancient Greek. Reading of selected ancient authors.

2001–2 **Intermediate Classical Greek** (3–3) Staff

Reading of ancient Greek prose or poetic works (e.g., selections from Homer, Plato, Euripides). Review of grammar. Prerequisite: Grek 1001–2 or equivalent.

3001–2 **Major Greek Authors** (3–3) Staff

Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Grek 2002 or equivalent.

HEBREW

1001–2 **Beginning Hebrew I–II** (4–4) Staff

An active presentation of Hebrew as it is spoken and written today. Comprehension, speaking, reading, and writing skills are stressed. Laboratory fee.

2001–2 **Intermediate Hebrew I–II** (4–4) Staff

Further development of skills in speaking, reading, writing, and comprehension of modern Hebrew. Texts range from Israeli newspaper items to selections from classical materials. Prerequisite: Hebr 1001–2 or equivalent. Laboratory fee.

3001 **Hebrew Conversation and Writing** (3) Staff

Reading and writing at the intermediate to mid-high level, with stress on conversation and oral comprehension. Contemporary cultural and social aspects presented through selections from nonfiction and short fiction, films, and TV programs. Prerequisite: Hebr 2002 or permission of instructor.

3101 **Modern Hebrew Literary Classics (3)** Staff

Prose and poetry of a century of writing from the beginning of the Hebrew literary renaissance to contemporary Israeli literature, including works of Bialik, Agnon, Hazaz, Amichai, Oz, and Yehoshua. Discussions stress historical development and authors' treatments of tradition and modernity.

3102 **Israeli Society and Culture: Literary Perspectives (3)** Staff

A study of literature reflecting such contemporary issues as the conflict between the "builders' generation" and their children; the cultural contacts of Ashkenazim and Sefardim; image of the Arab; impact of the Holocaust; Zionist ideals and current realities.

3103 **Israeli Cinema (3)** Staff

Film considered as both an artistic and a historical medium that reflects and comments on the history, politics, and culture of Israel. The kinds of issues that Israeli films raise and the cinematic style that distinguishes them.

3301 **Modern Hebrew Fiction (3)** Staff

Study of selected modern Israeli short stories and poems. Prerequisite: Hebr 3001 or permission of instructor.

3302 **The Israeli Media (3)** Staff

Explores the Israeli press, television and radio news broadcasts in Hebrew; focuses on developing increasing proficiency in reading and aural comprehension through class

discussions and written assignments in Hebrew. Prerequisite: Hebr 3001 or permission of instructor.

4001–2 **Advanced Hebrew Literature (3–3)** Staff

Selections from Hebrew literature throughout the ages: Bible, Rabbinnics, medieval Hebrew literature; classical motifs in modern Israeli literature. Literary analysis (writing and discussion) in Hebrew. Prerequisite: Hebr 3301 or permission of instructor.

LATIN

1001–2 **Beginning Latin I–II (4–4)** Staff

Grammatical essentials of Latin, appropriate reading selections, development of English derivatives, introduction to Roman life and literature.

2001 **Intermediate Latin (3)** Staff

Development of ability to read and understand Latin literature of moderate difficulty. Prerequisite: Latn 1001–2 or equivalent.

2002 **Vergil's Aeneid (3)** Staff

Significant passages of Vergil's famous epic in Latin; reading and discussion of the entire poem in translation. Prerequisite: Latn 2001 or permission of instructor.

3001–2 **Major Latin Authors (3–3)** Staff

Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Latn 2001, 2002; or permission of instructor.

PERSIAN

1001–2 **Beginning Persian I–II (4–4)** Staff

Fundamentals of speaking, understanding, reading, and writing of Modern Standard Persian. Laboratory fee.

2001–2 **Intermediate Persian I–II (4–4)** Staff

Continuation of Pers 1001–2. Further development of speaking, understanding, reading, and writing skills of Modern Standard Persian. Prerequisite: Pers 1001–2 or equivalent. Laboratory fee.

3001 **Advanced Persian (3)** Staff

Development of writing, reading, speaking, and listening skills at the advanced level of proficiency. Prerequisite: Pers 2001–2 or equivalent. Laboratory fee.

3002 **Media Persian (3)** Staff

Introduction to Persian journalistic style through a variety of media sources, such as print, Internet, radio, and television. Critical analysis of authentic news and proficiency-oriented projects.

TURKISH

1001–2 **Beginning Turkish I–II (4–4)** Staff

Fundamentals of speaking, understanding, reading, and writing of Modern Standard Turkish. Laboratory fee.

2001–2 **Intermediate Turkish I–II (4–4)** Staff

Continuation of Turk 1001–2. Further development of speaking, understanding, reading, and writing skills of Modern Standard Turkish. Prerequisite: Turk 1001–2 or equivalent. Laboratory fee.

YIDDISH

1001–2 **Yiddish for Reading and Conversation (3–3)** Ticktin

Grammatical essentials of the language, appropriate reading selections, conversational exercises for beginners.

CLASSICAL STUDIES (in English)

2104 **Ancient Medicine and Modern Medical Terms (3)** Staff

The formation of medical terms derived from Greek and Latin, along with principles that govern the derivation of their meaning. The course includes a survey of ancient medical centers and practices.

2105	Special Topics (3)	Staff
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Topics in Greek and Roman literature and culture; topics announced in the
Schedule of Classes. May be repeated for credit provided the topic differs.

2106 **Mythology of the Classical World (3)** Staff

The creation of the world, the nature of the gods, and the adventures of heroes as described in various Greek and Roman literary sources (e.g., epic, drama, hymns) and as shown in ancient art.

2107	Greek and Roman Drama (3)	Staff
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Study of Greek and Roman tragedy and comedy; the nature and setting of dramatic performance in classical antiquity.

2112	Early Aegean and Greek Civilizations to 338 B.C. (3)	Staff
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Same as Hist 2112.

2113 **The Roman World to 337 A.D. (3)** Staff

Same as Hist 2113.

2803 **The Ancient Near East and Egypt to 322 B.C. (3)** Cline

Same as Hist 2803.

2804 **History of Ancient Israel (3)** Cline

Same as Hist 2804.

- 3111 **Topics in Ancient History (3)** Staff
- May be repeated for credit provided the topic differs. Same as Hist 3111.
- 3114 **Topics in Ancient Literatures and Cultures (3)** Staff
- May be repeated for credit provided the topic differs.
- 3115 **Topics in Ancient Art and Archaeology (3)** Staff
- May be repeated for credit provided the topic differs. Same as AH 2105.
- 3901 **Directed Project (1, 2, or 3)** Staff
- 4901 Individual advanced reading or research, to be arranged with a member of
the faculty. May be repeated for credit. Admission by permission of
instructor and department.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

- 1020 **Peer Writing Preceptor (0)**
- Permission of the University Writing Program required for registration.
- 2154 **Elective Internship (0 to 3)**
- Fieldwork and academic work carried out under faculty supervision.
- Students contract with agency, faculty, and Columbian College. May be
repeated to a maximum of 6 credits. Admission by permission of Columbian
College. Graded on a *P/NP* basis only. Zero credit option available only
during summer sessions.
- 2190 **Special Interdisciplinary Topics (1 to 3)**
- May be repeated for credit provided the topic differs.
- 3001 **Faculty-Guided Research (1 to 3)**

At the invitation of a faculty member, advanced students engage in research efforts, based on the faculty member's current research projects, that may include bibliographic research, translation, analysis of texts, and similar efforts. May be repeated for credit.

4191 Special Interdisciplinary Major Capstone (3)

Required of all students completing a special interdisciplinary major with honors.

COMMUNICATION

See **Organizational Sciences and Communication**.

COMPUTER SCIENCE

Professors S.Y. Berkovich, R.S. Heller, H.-A. Choi, A. Youssef (*Chair*), B. Narahari, J.K.

Hahn, R. Simha

Associate Professors S. Rotenstreich, A. Bellaachia, X. Cheng, P. Vora, N. Zhang, M. Diab

Assistant Professors G.A. Parmer, E. Drumwright, M. Clarkson, C. Monteleoni, H. Wee, T.

Wood, G. Sibley

See the School of Engineering and Applied Science for programs of study leading to the Bachelor of Arts and Bachelor of Science with majors in computer science.

Note: With the exception of CSci 1010, CSci courses numbered 1041 and below may not normally be counted toward degree requirements for computer science majors, unless approved by a department advisor. Credit may be earned for only one course in each of the following pairs of courses: CSci 2441/6441, 3362/6362, 4223/6223, 4331/6331, 4341/6341, 4364/6364, 4431/6431, 4521/6521, 4525/6525, 4527/6527, 4531/6531, 4532/6532, 4541/6541.

1010 Computer Science Orientation (1)

Narahari and Staff

Introduction to the field of computer science. Basic and emerging concepts and applications of computer science. Hands-on experiments and team projects. Technical resources, professional ethics, writing, and presentation. (Fall)

1011 Introduction to Programming with Java (3) Simha and Staff

An introductory course in programming a computer, using the Java language. Object-oriented programming, classes, applets, methods, control structures, inheritance, overriding, GUI widgets, containers, and exceptions. (Spring)

1020 Applications Software (3) Heller and Staff

Introduction to the use of microcomputer hardware and software for word processing (e.g., Word), spreadsheets (e.g., Excel), and database management (e.g., Access), with emphasis on the use of computers to solve typical problems in academia and business. (Fall and spring)

1021 Introduction to Computers and the Internet (3) Staff

Survey of computers and languages. Introduction to computer programming. History of computing and networking. The effects of computing and the Internet on our lives. E-commerce and new technologies. Concepts of web page design. (Fall and spring)

1022 Introduction to Internet Technology (3) Heller and Staff

An introductory course for non-technical students who wish to obtain a better understanding of the hardware and software that comprise the Internet. Information transfer over fiber, routing and switching of packets, methods of information transfer, protocols, software, ISP, web pages and multimedia. (Fall and spring)

1023 Introduction to Web Software Development (3) Staff

Introduction to the Internet. Topics include address and URL to find your way, linking to a URL, HTML and web programming, building a web page, building a home page, client–server techniques. (Fall and spring)

1030 Technology and Society (3)

Staff

Historical, social, and ethical issues of the technological age. Ethical principles and skills and social analysis skills needed to evaluate the design and implementation of complex computer systems. Privacy, computer crime, equity, intellectual property, professional ethics. Data collection, analysis, and presentation; technical writing and oral communication skills. (Fall)

1041 Introduction to FORTRAN Programming (3)

Staff

Structured programming with high-level language using FORTRAN. Control structures. Different data types with emphasis on real and complex number computations. Arrays used with vector and matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Prerequisite or corequisite: Math 1220 or 1231. (Spring)

1111 Introduction to Software Development (3)

Wood and Staff

Introduction to the solution of problems on a digital computer using the Java language. Object-oriented programming concepts; documentation techniques; design of test data. Writing, debugging, and running programs in an interactive computing environment. (Fall)

1112 Algorithms and Data Structures (3)

Drumwright and Staff

Object-oriented software. Inheritance, exceptions, development of classes, event-driven programming. Data structures such as trees, lists, stacks, queues, and strings. Sorting

and searching. Introduction to algorithm performance prediction. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 1111. (Spring)

1121 Introduction to C Programming (3) Staff

Structured programming with the C language. Control structures. Data types. Use of pointers. Matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Introduction to C++. Complex number representation. Corequisite: Math 1220 or 1231. (Spring)

1131 Introduction to Programming with C++ (3) Staff

Intensive introductory course for students with a science, mathematics, or other quantitative background. Solution of numerical and nonnumerical problems on a digital computer using C++ programming language in a Unix environment. Recommended for graduate and advanced undergraduate students in other departments. Prerequisite: Math 1232 or equivalent. (Fall)

1132 Data Structures and Software Design (3) Youssef and Staff

Data structures such as trees, lists, stacks, queues, and strings. Big-O notation and introduction to algorithm performance analysis. Solutions of numerical and non-numerical problems. Use of I/O libraries. Application development and software testing. Prerequisite: CSci 1121. (Fall)

1311 Discrete Structures I (3) Vora, Youssef, and Staff

Mathematics for computer science. Sets, functions, sequences. Propositional and predicate calculus, formal proofs, mathematical induction. Matrices, semigroups, groups, isomorphism. Relations, partitions, equivalence relations, trees, graphs. May be taken for

graduate credit by students in fields other than computer science. Prerequisite: CSci 1010 or 1121; Math 1220 or 1231. (Fall and spring)

2113 Software Engineering (3)

Simha and Staff

Programming techniques and software development in one or more programming languages. Application development with GUIs, database access, threads, Web programming. Prerequisite: CSci 1112. (Fall)

2312 Discrete Structures II (3)

Vora, Youssef, and Staff

Basic discrete techniques in computer science. Algebraic structures, vector spaces, linear transforms, norms, matrices, complex numbers, convolution and polynomial multiplication, Fourier analysis, discrete Fourier transform, number theory. Applications to computer security, coding theory, and audiovisual signal processing. Prerequisite: CSci 1311 and Math 1231.

(Fall)

2441 Database Systems and Team Projects (3)

Narahari and Staff

Design of relational database systems, relational query languages, normal forms, design of database applications. Team software development, integration, and testing. Professional code of ethics, intellectual property, privacy, software copyrights. Corequisite: CSci 2113. (Spring)

2461 Computer Architecture I (3)

Narahari and Staff

Number representation, computer arithmetic, digital logic and circuit design. Computer organization, micro-architecture and processor datapath, assembly and machine language programming. Introduction to memory organization and the hardware–software

interface. Implementation of high-level language constructs. Prerequisite: CSci 1112; corequisite: CSci 2113. (Fall)

3212 Algorithms (4)

Simha and Staff

Core concepts in design and analysis of algorithms, data structures, and problem-solving techniques. Hashing, heaps, trees. Graph algorithms, searching, sorting, graph algorithms, dynamic programming, greedy algorithms, divide and conquer, backtracking. Combinatorial optimization techniques. NP-completeness. Prerequisite: CSci 1311, 2113. (Fall)

3221 Programming Languages (3)

Clarkson and Staff

Programming language and software design fundamentals. Writing programs in a non-procedural programming language. Closures; procedure and data abstraction; object-oriented, procedural, and declarative programming; continuation compilation and interpretation, and syntactic extension. Advanced control structures appropriate for parallel programming. Prerequisite: CSci 2113. (Spring)

3240 Pre-Senior Design with Research (3)

Parmer, Simha

For students who wish to combine a research project with their Senior Design project. The goal is to complete the research, under a faculty mentor, within three semesters. Prerequisite: CSci 3212, 3313, 3411, and permission of instructor. (Spring)

3313 Foundations of Computing (4)

Choi and Staff

Theoretical foundations. Formal languages and automata; regular expressions, context-free languages; finite state automata and pushdown automata; Turing machines and computability, recursive function theory, undecidability. Compiler construction. Lexical and

syntax analysis; parsing and parsing techniques; lexical and parsing tools. Prerequisite: CSci 2461, 2113. (Fall)

3362 Probability for Computer Science (3) Monteleoni and Staff

Introduction to probability and statistics for computer scientists. Random variables. Conditional probability, independence, correlation. Applications to computer science, including information theory, data compression, coding, inference, Markov chains, introduction to randomized algorithms. Prerequisite: Math 1232, CSci 1311; or permission of instructor. (Spring)

3410 Systems Programming (3) Parmer, Wood, and Staff

Concepts underlying all computer systems. Processor operation, hierarchical memory systems, embedded boards, data acquisition, actuation, and systems software such as compilers, linkers, and operating systems from the programmer's perspective. Use of embedded platforms to examine how programs interact with and are constrained by hardware. Prerequisite: CSci 2461, 2113. (Spring)

3411 Operating Systems (4) Parmer and Staff

Process management, process state, concurrent processing, synchronization, events. Operating system structure, the kernel approach, processor scheduling, task switching, monitors, threads. System management, memory management, process loading, communication with peripherals. File systems. Socket programming, packets, Internet protocols. Prerequisite: CSci 2461, 2113. (Fall)

3462 Computer Architecture II (3) Narahari and Staff

Computer organization. Design of computer components and of a simple computer. Instruction set and assembly language of a pipelined RISC processor. Introduction to high-

performance processors. Design of cache, main memory, and virtual memory systems.

Program performance models and system performance. The I/O structure and peripherals.

Prerequisite: CSci 2461, 2113. (Spring)

3571 **Introduction to Bioinformatics** (3) Simha and Staff

Same as BiSc 2584.

3907 **Special Topics** (1 to 3) Staff

Topic to be announced in the Schedule of Classes. (Fall and spring)

3908 **Research** (1 to 3) Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

4222 **Theory of Computer Translators** (3) Choi and Staff

Lexical and syntax analysis, regular expressions, context-free grammars, parsing techniques, top-down parsing, efficient parsing, syntax-directed translation, intermediate formats, flow of control, block structures, procedure calls, symbol tables, run-time storage, error-detection and recovery, code optimization, code generation. Prerequisite: CSci 3462, 3313. (Spring)

4223 **Principles of Programming Languages** (3) Clarkson and Staff

Fundamental concepts underlying design of programming languages. Detailed study of functional and object-oriented computational models. Types, evaluation, abstraction, control flow, modules, mutation, laziness, polymorphism, subtyping, inheritance. Practice learning new languages. Prerequisite: CSci 1311, 2113. (Spring, odd years)

4235 **Development of Open-Source Software** (3) Staff

Design, process, tools, and culture of open-source software development. Cross-platform development and testing. Geographic dispersal, social and team dynamics, licenses (GPL, BSD, other); code reuse (modular code, shared libraries); very-large-scale distributed development techniques (CVS, Bugzilla, release-management, mailing-lists). May be taken for graduate credit. Prerequisite: CSci 2113 or 6221. (Fall)

4237 Software Design for Handheld Devices (3) Staff

Design of interactive software for handheld devices. Event driven programming, user interface design practices, memory management, handheld debugging techniques. May be taken for graduate credit. Prerequisite: CSci 2113 or 6221. (Spring)

4243–44 Capstone Design Project I–II (4–4) Simha, Parmer, and Staff

Planning, design, and construction of the capstone project. Economic analysis of the project. Application of software engineering principles, including software requirements, specification, requirements engineering, reuse, documentation, verification/validation, testing, configuration management. Report writing and presentations. Prerequisite: senior status. (Fall and spring)

4314 Discrete Analysis in Computer Science (3) Berkovich and Staff

Combinatorial theory: permutations and combinations, generating functions, recurrence relations, the principle of inclusion and exclusion. Block designs. Applications to the analysis of algorithms, computer organization, VLSI placement, coding theory, simulation, and other problems. May be taken for graduate credit. Prerequisite: CSci 1311 or permission of instructor. (Fall)

4331 Cryptography (3) Vora and Staff

Algorithmic principles of cryptography from Julius Caesar to public key cryptography. Key management problems and solutions. Cryptographic systems and applications. Prerequisite: CSci 2312, 3313, 3212. (Spring)

4341 **Continuous Algorithms** (3) Simha and Staff

Overview of structures in continuous mathematics from a computational viewpoint. Main topics include continuous system simulation, computational modeling, probability, statistical techniques, next-event simulation, algorithms for continuous optimization, machine learning, neural networks, statistical language processing, robot control algorithms. Prerequisite: CSci 1311, 2113. (Spring)

4361 **Simulation Methods** (3) Simha and Staff

Computational methods for continuous and discrete system simulation. Effects of computer software and hardware architectures on computational precision and accuracy requirements. Random-number generation and testing. Calibration and scaling technique. Verification and validation technique. May be taken for graduate credit. Prerequisite: CSci 2113. (Spring)

4364 **Machine Learning** (3) Monteleoni and Staff

Overview of core machine learning techniques: nearest-neighbor, regression, classification, perceptron, kernel methods, support vector machine (SVM), logistic regression, ensemble methods, hidden Markov models (HMM), non-parametrics, online learning, active learning, clustering, feature selection, parameter tuning, and cross-validation. Prerequisite: CSci 3212, 3362, Math 2184; or permission of instructor. (Spring)

4415 **Real-Time and Embedded Systems** (3) Narahari and Staff

Development of software for real-time control of physical systems. Reliability and fault tolerance, exceptions and exception handling, reliability and concurrent processes, timeouts, deadline scheduling, shared-memory and message-based device drivers. May be taken for graduate credit. Prerequisite: CSci 2113. (Spring)

4417 UNIX System Programming (3) Narahari and Staff

Exposure to UNIX internals. Use of UNIX system calls and utilities in conjunction with script and C programs. RFCs, GNU project, and other collaborative traditions in the UNIX community. May be taken for graduate credit. Prerequisite: Senior status or 1 year of C programming and UNIX user experience. (Fall)

4418 Unix System Administration (3) Narahari and Staff

System administration for the stand-alone system or small networks. Installation of two or more UNIX variants (Linux, FreeBSD, Solaris) on Intel or Sparc platforms. Configuration of mail, name services, and other network utilities. Backup and recovery, security and ethics. May be taken for graduate credit. Prerequisite: CSci 4417. (Spring)

4431 Computer Networks I (3) Cheng and Staff

Higher-layer protocols and network applications on the Internet, such as session layer, presentation layer, data encryption, directory services and reliable transfer services, telnet, network management, network measurements, e-mail systems, and error reporting. Prerequisite: CSci 2461, 2113. (Fall)

4432 Computer Networks II (3) Cheng and Staff

Computer networks and open system standards. Network configurations and signals, encoding and modulation, transmission media, connection interfaces, error detection and correction, signal compression, switching, link layer control, ISDN, X.25, frame relay,

ATM, and Sonet. Bridges, routers, and routing algorithms. Prerequisite: CSci

4431. (Spring)

4455 Computer Game Design and Programming (3) Hahn and Staff

Principles, techniques, and design of computer games. Graphic game engines, modeling, motion, AI and interaction; sound design and synthesis; real-time software and hardware issues. May be taken for graduate credit. (Fall)

4511 Artificial Intelligence Algorithms (3) Sibley and Staff

Knowledge representation and reasoning, propositional logic and predicate calculus. Logic programming. Search, game trees, backtracking. Planning. May be taken for graduate credit. Prerequisite: CSci 3221, 3212. (Spring)

4521 Autonomous Robotics: Sibley, Drumwright, and Staff

Mobility and Perception (3)

Overview of autonomous mobile robotics. Sensing, localization, calibration, mapping, perception, decision making, planning, and control. Emphasis on algorithmic rather than hardware aspects of robotics. Development of algorithms that can operate autonomous mobile platforms in complex, real-world environments. Prerequisite: Math 1232, 2184; CSci 3362 or 4341.

(Fall)

4525 Autonomous Robotics: Manipulation (3) Drumwright, Sibley, and Staff

Introduction to robot manipulation. Core principles necessary to program robots for autonomous operation in dynamic and typically human-centric environments.

Transdisciplinary concepts from computer science (reinforcement learning, perception),

mechanical engineering (kinematics, dynamics), and electrical engineering (control theory).

Prerequisite: permission of instructor. (Spring)

4527 Introduction to Computer Vision (3) Sibley and Staff

Introduction and overview of computer vision. Image-formation signal processing and filtering. Saliency, image features and feature extraction, tracking, stereo disparity estimation, structure from motion, photogrammetry, optic flow, homography estimation and warping, scene segmentation, place recognition, object recognition, robust estimation, and camera calibration. Prerequisite: Math 1232, 2184; CSci 4362 or 4341. (Spring)

4531 Computer Security (3) Vora and Staff

Risk analysis, cryptography, operating system security, identification and authentication systems, database security. Prerequisite: CSci 3411; corequisite: CSci 4431. (Fall)

4532 Information Policy (3) Staff

Roles, issues, and impacts of computer-based information systems in national and international arenas, focusing on privacy, equity, freedom of speech, intellectual property, and access to personal and governmental information. Professional responsibilities, ethics, and common and best practices in information use. (Fall)

4541 Network Security (3) Zhang and Staff

Security protocols and applications in local, global, and wireless networks; IPSec and packet-level communication security systems; network authentication and key-exchange protocols; intrusion detection systems and firewalls; secure network applications; network worms and denial-of-service attacks. Prerequisite: CSci 4531. (Spring)

4551 Concepts and Applications of Computer Graphics (3) Hahn and Staff

Introduction to computer graphics without programming; building 3-D geometry and rendering; computer animation; virtual reality and computer games; hands-on projects in modeling, rendering, and animation using commercial software; hands-on projects in photo and video manipulation. (Spring)

4552 Design of Computer Animation I (3) Hahn and Staff

Use of commercial 3-D computer animation packages to create digital artistic works. Principles of animation, including timing, exaggeration of motion, and anticipation; use of a storyboard; modeling; motion; rendering and editing. Prerequisite: CSci 4551. (Fall)

4553 Design of Computer Animation II (3) Hahn and Staff

Use of commercial 3-D animation packages to create artistic works and visualizations. Process-spanning concepts of development through pre-production, production, and post-production. Emphasis on developing original content and attaining high production values. Prerequisite: CSci 4552. (Spring)

4554 Computer Graphics I (3) Hahn and Staff

Hardware; concepts of graphics subroutine packages; programming concepts for interaction, display, and data structuring; basic clipping and scan-conversion algorithms; homogeneous coordinates; three-dimensional viewing transforms; basic rendering. May be taken for graduate credit. Prerequisite: CSci 2113 or 6221. (Fall)

4561 Design of User–Interface Programs (3) Staff

Structure of interactive programs. Widgets, windows, and input devices. Client–server model, event-driven programming, and callbacks. Window systems (e.g., Xwindows) and dialog control. May be taken for graduate credit. Prerequisite: CSci 2113 or 6221. (Spring)

4572 Computational Biology (3)

Simha and Staff

Pairwise alignment and scoring. Multiple sequence alignment. Fragment assembly, physical mapping of DNA. Phylogenetic trees. Molecular structure prediction and protein folding. Microarrays and microarray data, image comparison. Clustering. Overview of biological databases, PDB, MMDB, GenBank. Draft genomes and genome browsers. Pathway databases. May be taken for graduate credit. Prerequisite: CSci 3571 and 3212 or 6212. (Spring)

4576 Introduction to Biomedical Computing (3)

Rotenstreich and Staff

A survey of the problems and solutions in biomedical computing. Application of computers in medicine. Patient care and monitoring systems, electronic medical records, digital imaging and analysis. Telemedicine, medical ethics, health care regulations and organizations. (Spring)

4577 Biomedical Computing (3)

Rotenstreich and Staff

Computing issues in epidemiology and biosurveillance, decision support, medical imaging and visualization, image-guided surgery; medical databases, issues in system integration, mobile medical computing. May be taken for graduate credit. Prerequisite: CSci 2113, 4576; corequisite: CSci 2441. (Spring)

COUNSELING

Programs in counseling are offered at the graduate level by the Graduate School of Education and Human Development through its Department of Counseling and Human Development. The following courses are available to undergraduates.

2162 Professional and Ethical Orientation to Counseling (3)

Staff

The roles and functions of a professional counselor and the ethical standards that govern the profession.

2163 **Psychosocial Adjustment (3)** Staff

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents.

2376 **Introduction to Rehabilitation Counseling (3)** Staff

Overview of rehabilitation profession, including philosophy, history, ethics, theory, legislation, settings, and practice.

2378 **Disability Management and Psychosocial Rehabilitation (3)** Staff

Case management services for persons with physical, mental, and emotional disabilities.

2381 **Medical and Psychosocial Aspects of Disabilities (3)** Staff

Chronic and traumatic disorders; rehabilitation and psychosocial implications.

CRIMINAL JUSTICE

See **Sociology**.

DANCE and DRAMA

See **Theatre and Dance**.

DRAMATIC LITERATURE

Columbian College of Arts and Sciences offers an interdisciplinary program in dramatic literature leading to the degree of Bachelor of Arts. This major, which combines the strengths of the Departments of English and of Theatre and Dance, is designed to give equal consideration to the two key aspects of theatre—the literary text and the production.

Bachelor of Arts with a major in dramatic literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—A two-course sequence chosen from Engl 1410–11, 1830–40, 1510–11, 1610–11, 1710–11.
3. Required courses for the major (42 credit hours):
 - (a) Engl 2800 and 3440 or 3441; Engl/TrDa 3240; TrDa 3245–46; one course chosen from 3630, 3631, 3710.
 - (b) 12 credit hours in performance and production courses in the Department of Theatre and Dance, including TrDa 1214, 1330, 4275.
 - (c) 9 credit hours in drama courses or related topics selected from Engl 3440 or 3441, 3470–71, 3630–31, 3710; Engl/TrDa 2240, 2250, 3250; TrDa 3248.
 - (d) 3 credit hours of a senior capstone experience in dramaturgical practice through one of the following: TrDa 4596, 4598, 4599; Engl 4250, 4360, 4470.

EAST ASIAN LANGUAGES AND LITERATURES

Professors J. Chaves, Y.-K. Kim-Renaud (*Chair*), S. Hamano

Associate Professor P.N. Zhang

Assistant Professors I.L. Hanami, L. Chen

Teaching Assistant Professors H. Dong, M.D. Pak, T. Tsujioka

Teaching Instructor M. Wei

Professorial Lecturers J. Finch, M. Frost

Lecturers W.K. Cavanaugh, Y. Kang, M. Sato

Bachelor of Arts with a major in Chinese language and literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Chin 1001–2, 2003–4; or equivalent.
3. Required for the major—Chin 3105–6, 4107–8, 3109–10, 3111–12, and 12 additional credit hours of upper-division Chinese courses; plus 6 hours in related upper-division courses outside the program, as approved by the program advisor.

Bachelor of Arts with a major in Japanese language and literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Japn 1001–2, 2003–4; or equivalent.
3. Required for the major—Japn 3105–6, 4109, 3111–12, and 18 additional credit hours of upper-division Japanese courses; plus 9 hours in related upper-division courses outside the program, as approved by the program advisor.

Minor in Chinese language and literature—Prerequisite: Chin 1001–2, 2003–4; or equivalent. The minor consists of Chin 3105–6 and 12 additional credit hours of upper-division Chinese courses.

Minor in Japanese language and literature—Prerequisite: Japn 1001–2, 2003–4; or equivalent. The minor consists of Japn 3105–6 and 12 additional credit hours of upper-division Japanese courses.

Minor in Korean language and literature—Prerequisite: Kor 1001–2, 2003–4; or equivalent. The minor consists of Kor 3105–6 and 12 additional credit hours of upper-division Korean courses.

CHINESE

1001–2 **Beginning Chinese I–II** (4–4) Staff

Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee. (Academic year)

1011 **Intensive Beginning Chinese** (8) Staff

Intensive beginning course equivalent to Chin 1001–2. Laboratory fee.

1088 **E-learning Tools for Chinese** (1) Zhang

Basic training for using computer programs, software, or web tools for Chinese word processing. Prerequisite: Chin 1001. Laboratory fee.

(Spring)

2003–4 **Intermediate Chinese I–II** (4–4) Wei and Staff

Continuation of grammar, with emphasis on speaking, reading, and writing.

Prerequisite: Chin 1002 or 1011 to 2003, Chin 2003 to 2004. Laboratory fee.

(Academic year)

3105–6 **Intermediate Chinese III–IV** (3–3) Staff

Augmentation of vocabulary, reading of texts, essay writing practice, and oral presentation and discussion. Prerequisite: Chin 2004 to 3105, Chin 3105 to 3106.

Laboratory fee. (Academic year)

3109–10 **Introduction to Classical Chinese** (3–3) Chaves

Introduction to classical writings in Chinese literature, history, and philosophy.

Prerequisite: Chin 2004 or equivalent. (Academic year)

3111–12 **Chinese Literature in Translation** (3–3) Chaves

An introductory survey of Chinese literature read in English translation, including fiction, poetry, drama, essays, diaries, testimonials. Chin 3111: the pre-modern period; Chin 3112: the modern period. (Academic year)

3123–24 **Introduction to Chinese Linguistics (3–3)** Staff

The structure of the Chinese language, including such topics as the structure of sounds and words, sentence meaning and structure, the writing system, adaptation of foreign vocabulary, pragmatics, variation, and change. Course conducted in English. (Academic year)

3136 **Chinese Women in Myth, Literature, and Film (3)** Chen

Women's position in Chinese cultural and political life from prehistoric myth to the present time. Confucian writing, traditional theatre, and films and novels set in China. A general survey of Chinese history establishes the context for discussions of cultural and political phenomena, such as foot binding and the one-child policy. Course conducted in English. Same as WStu 3136. (Fall and spring)

3162 **Chinese Culture Through Film (3)** Chen

Survey of the Chinese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Course conducted in English.
(Fall and spring)

3171–72 **Poetry of the Tang and Song Periods (3–3)** Chaves

Reading of works of leading poets. Discussion of content and style. Prerequisite: Chin 3109 or equivalent. (Alternate academic years)

3173 **Chinese Drama and Theatre (3)** Chen

Chinese drama and theatrical genres. Topics include the relation between theatrical performance and ritual practice, gender identities, and cross-cultural exchange. Course conducted in English. (Fall)

3841 **Religion in Modern China** (3) Staff

Same as Rel 3841.

4107–8 **Readings in Modern Chinese** (3–3) Staff

Readings in newspapers, social science materials, and documentary materials.

Prerequisite: Chin 3106 or equivalent. (Academic year)

4119 **Business Chinese** (3) Zhang

Basics of business-related communication in both oral and written form. Integrated language skills. Prerequisite: Chin 4107 or 4121 or equivalent preparation approved by the instructor. (Spring)

4121–22 **Advanced Conversation and Composition I–II** (3–3) Zhang and Staff

Productive skills at the advanced discourse level, topic-specific practice of commonly used speech patterns and writing formats. Prerequisite: Chin 3106 to 4121, Chin 4121 to 4122, and permission of instructor. (Academic year)

4179–80 **20th-Century Chinese Literature** (3–3) Chen

Selected works of major 20th-century writers, including Lu Xun, Lao She, Zhang Ailing, Bai Xianyong, and others. Lectures and discussion in Chinese. Prerequisite: Chin 4107 or equivalent. (Academic year)

4185–86 **Directed Reading** (3–3) Chen

Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year)

4198–99 **Proseminar: Readings for the Major** Staff

in Chinese Language and Literature (3–3)

Recommended for all majors. Preparation for advanced research in Chinese sources.

One-on-one tutorials, seminar meetings, and practice in consulting Chinese reference works, both traditional and modern. Literary criticism; keeping abreast of sinological scholarship. Prerequisite: Chin 3106 to 4198, Chin 4198 to 4199. (Academic year)

JAPANESE

1001–2 **Beginning Japanese I–II (4–4)** Hamano, Tsujioka

Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee. (Academic year)

1005 **Intensive Beginning Japanese (8)** Staff

Intensive beginning course equivalent to Japn 1001–2. Laboratory fee.

(Summer)

2003–4 **Intermediate Japanese I–II (4–4)** Hamano, Tsujioka

Continuation of grammar, with emphasis on speaking, reading, and writing.

Prerequisite: Japn 1002 or 1005 to 2003, Japn 2003 to 2004, or approval of instructor.

Laboratory fee. (Academic year)

2006 **Intensive Intermediate Japanese (8)** Staff

Intensive intermediate course equivalent to Japn 2003–4. Prerequisite: Japn 1002 or 1005. Laboratory fee. (Summer)

3105–6 **Intermediate Japanese III–IV (3–3)** Staff

Continuation of reading of texts, writing of short pieces, conversation, systematic review of grammar. Prerequisite: Japn 2004 or 2006 to 3105, Japn 3105 to 3106; or approval of instructor. Laboratory fee. (Academic year)

3111–12 **Japanese Literature in Translation (3–3)** Hanami

An introductory survey of Japanese literature read in English translation, including fiction, poetry, drama, essays, diaries, testimonials. Japn 3111: the pre-modern period; Japn 3112: the modern period. (Academic year)

3162 **Japanese Culture Through Film (3)** Staff

Survey of the Japanese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from premodern times to the modern era. Lectures and discussion in English. (Fall and spring)

4107–8 **Readings in Modern Japanese (3–3)** Hanami and Staff

Readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Japn 3106 or approval of instructor. (Academic year)

4109 **Introduction to Bungo, Literary Japanese (3)** Hanami

Introduction to Bungo, the literary Japanese used in official government documents up to World War II, newspapers and journals through the Meiji period, and literature from the prose of the Tales of Ise to the poetry of Tawara Machi. Prerequisite: Japn 3106 or approval of instructor. (Fall)

4110 **Readings in Classical Japanese (3)** Hanami

Readings in premodern texts in Japanese literature, history, and philosophy. Prerequisite: Japn 4109 or approval of instructor. (Spring)

4121-22 **Advanced Conversation and Composition I-II (3-3)** Staff

Productive skills at the advanced discourse level, topic-specific practice of commonly used speech patterns and writing formats. Prerequisite: Japn 3106 to 4121, Japn 4121 to 4122. (Academic year)

4185-86 **Directed Reading (3-3)** Hanami and Staff

Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year)

4198-99 **Proseminar: Readings for the Major** Hanami, Hamano

in Japanese Language and Literature (3-3)

Recommended for all majors. Preparation for advanced research in Japanese sources. Practice in consulting Japanese reference material and translating sources for writing in English. Seminars on advanced reading, translation, and critical methodology. Prerequisite: Japn 3106 to 4198, Japn 4198 to 4199. (Academic year)

KOREAN

1001-2 **Beginning Korean I-II (4-4)** Pak

Fundamentals of grammar and pronunciation, with graded speaking, reading, and writing practice. Laboratory fee. (Academic year)

2003-4 **Intermediate Korean I-II (4-4)** Pak

Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee. (Academic year)

3105-6 **Intermediate Korean III-IV (3-3)** Pak

Continuation of reading of texts, writing of short pieces, conversation, and systematic review of grammar, focusing on business Korean. Prerequisite: Kor 2004 to 3105, Kor 3105 to 3106. Laboratory fee. (Academic year)

3111–12 **Korean Literature in Translation (3–3)** Kim-Renaud

An introductory survey of Korean literature read in English translation, including fiction, poetry, drama, essays, diaries, testimonials. Kor 3111: the pre-modern period; Kor 3112: the modern period. (Academic year)

3123–24 **Introduction to Korean Linguistics (3–3)** Pak

The structure of the Korean language, including such topics as the structure of sounds and words, sentence meaning and structure, the writing system, adaptation of foreign vocabulary, pragmatics, variation, and change. Course conducted in English. (Academic year)

3162 **Korean Culture Through Film (3)** Finch

The intersection of gender, class, and nation in contemporary society through the lens of Korean film. English subtitles; lectures and discussion in English. (Fall and spring)

4107–8 **Readings in Modern Korean (3–3)** Staff

Readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Kor 3106 or equivalent.

(Academic year)

VIETNAMESE

1001–2 **Beginning Vietnamese I–II (4–4)** Staff

Fundamentals of grammar and pronunciation, with an introduction to reading and writing. (Academic year)

2003–4 **Intermediate Vietnamese I–II (4–4)** Staff

Continuation of grammar, with emphasis on speaking, reading, and writing.

(Academic year)

EAST ASIAN LANGUAGES AND LITERATURES

1075 **East Asian Calligraphy (3)** Staff

Writing of Chinese characters with traditional writing implements. No knowledge of the language required. Covers the history, aesthetics, and philosophy of East Asian scripts and calligraphy and their relationships to paintings, seal carving, and literature. Same as FA 1075. (Fall and spring)

3811 **Confucian Literature in East Asia (3)** Staff

Same as Rel 3811.

3814 **Religion and Philosophy in East Asia (3)** Staff

Same as Rel 3814.

3821 **Religion and Ethics in East Asia (3)** Staff

Same as Rel 3821.

3831 **Daoism in East Asia (3)** Staff

Same as Rel 3831.

3832 **Myth, Ritual, and Popular Religion in China (3)** Staff

Same as Rel 3832.

4197 **Independent Study (1 to 3)** Staff

Departmental approval is required to register.

ECONOMICS

Professors J.L. Gastwirth, A.M. Yezer, J.J. Cordes, J. Pelzman, B.L. Boulier, M.D. Bradley,

S.C. Smith, P. Labadie, G.L. Kaminsky, D.O. Parsons, R.F. Phillips, M.O. Moore, N.

Vonortas, F.L. Joutz, S. Joshi, A.S. Malik, J.E. Foster, V. Fon, A. Lusardi, B.R.

Chiswick (*Chair*), B.S. Barnow

Associate Professors S.M. Suranovic, W.P. Mullin, R.M. Samaniego, C. Wei, M.X. Chen,

T. Sinclair, A. Fostel, J.C. Shambaugh

Assistant Professors P. Carrillo, I.R. Foster, E.W.K. Hovander, R. Fishman, T. Moore, R.C.

Jedwab, O. Timoshenko, B.D. Williams

Professorial Lecturers S.N. Kirby, R.S. Belous, D. Fixler, H. Hertzfeld, H. Stekler, F.D.

Weiss, L. Clauser, N. Pham

Bachelor of Arts with a major in economics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Econ 1011–12.
3. Required courses in related areas—Math 1221, 1231, or 1252; Stat 1111 and 2112, or equivalent; 6 credit hours of a social science other than economics.
4. Required courses in the major—Econ 2101 or 2103, 2102 or 2104, 4198, and six additional upper-division economics courses to be approved by the departmental advisor. A maximum of three regional courses (Econ 2133, 2169, 2170, 2185) can be counted toward the six additional courses. Of the three international courses (Econ 2180, 2181, and 2182), only two may be counted toward the major. Credit for either Econ 2101 or 2103 and for either Econ 2102 or 2104 can be applied toward a degree. Grades of C– or better are required in Econ 2101 (or 2103) and Econ 2102 (or 2104).

Bachelor of Science with a major in economics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Econ 1011–12.
3. Required courses in related areas—Math 1231 and 1232, or equivalent; Stat 1111 and 2112, or equivalent; 6 hours of additional course work in mathematics, statistics, systems engineering, or computer science, selected from the department’s list of designated courses and approved by the departmental advisor.
4. Required courses in the major—Econ 2101 or 2103, 2102 or 2104, 2123, 4198, and five additional upper-division economics courses to be approved by the departmental advisor. A maximum of three regional courses (Econ 2133, 2169, 2170, 2185) can be counted toward the five additional courses. Of the three international courses (Econ 2180, 2181, and 2182), only two may be counted toward the major. Credit for either Econ 2101 or 2103 and for either Econ 2102 or 2104 can be applied toward a degree. Grades of C– or better are required in Econ 2101 (or 2103) and Econ 2102 (or 2104). Students considering the Bachelor of Science major are encouraged to take Econ 2103 and 2104 rather than Econ 2101 and 2102.

Combined Bachelor of Science/Master of Arts in the field of economics—Students interested in this dual degree program should consult the undergraduate program advisor in the Economics Department by the second semester of the sophomore year.

Combined Bachelor of Arts or Bachelor of Science with a major in economics and Master of Public Policy—Students interested in this dual degree program should consult the director of the Public Policy Program by the second semester of their sophomore year.

Special Honors—Students may apply for graduation with Special Honors. To be eligible, a student must meet the requirements for Special Honors stated under University Regulations, must have a grade-point average of at least 3.5 in economics courses, and must submit an honors paper to the department. Upon review of the honors paper, the student may be recommended for graduation with Special Honors.

Minor in economics—(a) 18 credit hours in economics, including Econ 1011–12, 2101 or 2103, 2102 or 2104, and two other approved upper-division courses in economics; (b) one of the following: 6 credit hours of an approved statistics sequence, such as Stat 1111, 2112; or 6 hours of an approved mathematics sequence, such as Math 1231, 1232; or one approved statistics course, such as Stat 1111, and one approved mathematics course, such as Math 1231 or 1252; or one approved mathematics course or one approved statistics course and one additional upper-division course in economics (other than Econ 2133, 2169, 2170, or 2185). Stat 1129 cannot be used to satisfy the requirements of the minor. Credit for either Econ 2101 or 2103 and for either Econ 2102 or 2104 can be applied toward a degree. Grades of C– or better are required in Econ 2101 (or 2103) and Econ 2102 (or 2104).

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: Econ 1011–12 is prerequisite to all other courses offered by the Department of Economics.

1011–12 **Principles of Economics (3–3)**

Bradley, Samaniego,
Suranovic, Yezer, I. Foster

Major economic principles, institutions, and problems in contemporary life. Econ 1011: Microeconomics—supply and demand, the price system and how it works, competitive and monopolistic markets. Econ 1012: Macroeconomics—national income concepts, unemployment and inflation, institutions of monetary control. Econ 1011 is prerequisite to Econ 1012. (Econ 1011 and 1012—fall and spring)

2101 **Intermediate Microeconomic Theory (3)** Fon, Joshi, Malik, Boulier,
Parsons, Carrillo, T. Moore

Analysis of household economic behavior, including derivation of demand functions. Analysis of firm behavior, including derivation of supply frameworks. Demand and supply interaction under various market structures and in factor markets. Prerequisite: Math 1221, 1231, 1252, or equivalent.

(Fall and spring)

2102 **Intermediate Macroeconomic Theory (3)** Bradley, Joutz, Labadie,
Sinclair, Wei

Investigation of the determinants of national income, inflation, unemployment, and interest rates. Alternative business cycle theories, with emphasis on the role of imperfect information, uncertainty, and expectations. Prerequisite: Math 1221, 1231, 1252, or equivalent. (Fall and spring)

2103 **Intermediate Microeconomic Theory:** Boulier, Carrillo, Fon,
A Mathematical Approach (3) Joshi, Malik, Parsons

Analysis of household economic behavior, including derivation of demand functions, and of firm behavior, including derivation of supply frameworks. Demand and supply interaction under various market structures and in factor markets. Reliance on constrained

Recommended for students pursuing the B.S. degree. Corequisite: Math 1232 or equivalent.

(Fall and spring)

2104 **Intermediate Macroeconomic Theory:** Bradley, Joutz, Labadie,

A Mathematical Approach (3) Sinclair, Wei

Development and application of mathematical models of aggregate economic behavior with a focus on the intertemporal choices made by households, firms, and governments. The use of rigorous economic analysis provides a deeper understanding of the determinants of the economy's performance. Recommended for students pursuing the B.S. degree.

Corequisite: Math 1232 or equivalent. (Fall and spring)

2121 **Financial Economics** (3) Joutz, Labadie, Samaniego, Wei

Economic analysis of key financial institutions, markets, and variables. Investigation of the performance of asset markets and the roles of money, credit, interest rates, and exchange rates. Examination of private sector institutions like equity markets and the banking system and the roles of regulators like the Federal Reserve.

2122 **Monetary Theory and Policy (3)** Staff

Analysis of classic and modern monetary theories and their application to current economic conditions. The links between theory and policy. The altered role of money over time; the new money technology. (Spring)

2123 **Introduction to Econometrics (3)** Boulrier, Carrillo, Phillips,

Sinclair, Williams

Joint offering of the Economics and Statistics Departments. Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques

applicable to economic models. Prerequisite: Math 1231 or equivalent; Stat 2112 and 2118 or equivalent. (Fall and spring)

2133 Economics of the Former Soviet Union and Eastern Europe (3) Pelzman

Analysis of the transition process in the former Soviet Union and Eastern Europe.

Topics include economic models of planned economies and comparative analysis of economic development programs of the newly independent states and Eastern Europe.

(Fall)

2135 Microeconomic Public Policy Analysis (3) Staff

How microeconomic analysis can be used to analyze a variety of public policy issues.

Background on economic public policy analysis precedes analysis of various public policy issues that may include taxation of harmful products like cigarettes, government price

discrimination policy, vaccination policy, and occupational shortages. (Spring)

2136 Environmental and Natural Resource Economics (3) Fishman, Malik

Analysis of a variety of environmental and natural resource problems. The economic causes of these problems, their consequences, and the relative merits of alternative policies for dealing with them. (Spring)

2148 Health Economics (3) I. Foster, T. Moore

Economic analysis of the determinants of demand, supply, output, and distribution in the health care sector, with special emphasis on current policy issues of access, quality, and cost. (Spring)

2151 Economic Development (3) J. Foster, Jedwab, Smith

Theories and empirical studies of the economic problems of developing countries. (Fall and spring)

- 2157 **Urban and Regional Economics** (3) Yezer, Carrillo
- Analysis of the determinants of urban growth and development; firm location; the functioning of urban land and housing markets.
- 2158 **Industrial Organization** (3) Mullin
- Analysis of market structure, conduct, and performance of firms in a market economy, with emphasis on case studies of U.S. industries. (Fall)
- 2159 **Government Regulation of the Economy** (3) Mullin
- Economic analysis of antitrust and regulation in the American economy. Prerequisite: Econ 2101 or 2158. (Spring)
- 2167 **Economics of Crime** (3) Yezer
- Analysis of crime, both empirical and theoretical, that examines the links between law and economics, the economics of criminal participation, and the economics of law enforcement. (Spring)
- 2169 **Introduction to the Economy of China** (3) Staff
- Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall)
- 2170 **Introduction to the Economy of Japan** (3) Staff
- Analysis of the structure and growth of the Japanese economy. (Spring)
- 2180 **Survey of International Economics** (3) Fostel, M. Moore, Suranovic
- Basic concepts of international trade and international finance, with emphasis on policy issues.
- 2181–82 **International Economics** (3–3) M. Moore, Suranovic, Pelzman,
Chen, Fostel, Timoshenko

Econ 2181: International trade theory and policy. Econ 2182: International macroeconomic theory and policy. (Academic year)

2185 **Economic History and Problems of Latin America (3)** Staff

Analysis of present structures and problems of Latin American economies.

2195 **Special Topics (3)** Staff

Topics vary, depending on current issues of interest and faculty availability.

3105 **Economic Forecasting (3)** Staff

Theory and empirical analyses of economic trends and fluctuations; use of economic indicators and simple econometric models. Prerequisite: Econ 2102 or 2104; corequisite: Econ 2123. (Fall)

3142 **Labor Economics** (3) Chiswick, Parsons

Analysis of labor supply and demand; measurement and theory of unemployment; occupational choice; wage differentials; labor market issues and policies. Prerequisite: Econ 2101 or 2103. (Fall)

3161 **Public Finance: Expenditure Programs (3)** Cordes

Economic analysis of government spending and social regulation programs. Topics include public goods, externalities, income transfer and social insurance programs, and benefit–cost analysis of government programs. Prerequisite: Econ 2101 or 2103. (Fall)

3162 **Public Finance: Taxation (3)** Cordes

Economic analysis of taxes. Topics include individual and corporate income taxes, payroll taxes, sales and excise taxes, property and wealth taxes, design of tax systems, and effects of taxation on labor and capital markets. Prerequisite: Econ 2101 or 2103. (Spring)

3165 **Economics of Human Resources (3)** Boulier

Economic analysis of education and training, labor market discrimination, marriage and the family, and social security. Prerequisite: Econ 2101 or 2103.

3190 Law and Economics (3)

Pelzman, Fon

An introduction to the economic analysis of legal systems. How laws alter behavior and how laws might be designed to satisfy efficiency and fairness criteria. Prerequisite: Econ 2101 or 2103.

3191 Game Theory (3)

Joshi, Fon

An introduction to game theory, covering concepts such as Nash equilibrium, evolutionary games, backward induction and subgame perfection, Bayesian–Nash games of imperfect information, adverse selection, and moral hazard. Prerequisites: Econ 2101. (Fall and spring)

4198 Proseminar (3)

Boulier, Bradley, Fon, Joutz, Parsons,
Pelzman, Sinclair, Suranovic, Wei

Preparation and presentation of a research paper in any field of economics agreed upon by student and instructor. Review of selected topics in contemporary economics. Open only to economics majors in their senior year.

4199 Independent Research (3)

Staff

Prerequisite: Completion of 12 hours of upper-division economics courses, including Econ 2101 or 2103 and 2102 or 2104, with a minimum grade-point average of 3.4; and approval of an independent research project by a faculty member of the Economics Department.

EDUCATIONAL LEADERSHIP

Programs in educational leadership are offered at the graduate level by the Graduate School of Education and Human Development. The following course is open to undergraduates.

2701	Museums as Cultural and Educational Resources (3)	Staff
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A general introduction to museums as institutions, sources of information, and places for enjoyment. Classes take place on campus and at museums in the metropolitan area.

Admission by permission of instructor. (Spring)

ELECTRICAL AND COMPUTER ENGINEERING

Professors H.J. Helgert, R.H. Lang, N. Kyriakopoulos, E. Della Torre, R.J. Harrington, W.

Wasyliwskyj, M.H. Loew, R.L. Carroll, Jr., M.E. Zaghloul (*Chair*), M. Pardavi-

Horvath, B.R. Vojcic, K.B. Eom, C.E. Korman, T. El-Ghazawi, L. Bennett

(*Research*), S. Subramaniam, T.J. Manuccia (*Teaching*)

Associate Professors M. Doroslovacki, J.M. Zara, S. Ahmadi (*Teaching*), M.W. Kay, V.

Zderic

Assistant Professors G.P. Venkataramani, H.H. Huang, Z. Li, T. Lan, E. Simsek, V. Sorger,

A. Etemadi

Adjunct Professor L.J. Ippolito

Professorial Lecturers A. Mehrotra, D. Nagel, T. Farmer, S. Hussein, J. Scanlan, S.A.

Torrico

See the School of Engineering and Applied Science for programs of study leading to the Bachelor of Science with majors in electrical engineering, computer engineering, and biomedical engineering.

1010–20 **Introduction to Electrical, Computer,
and Biomedical Engineering (1–1)**

Korman and Staff

Basic and emerging concepts in electrical, computer, and biomedical engineering. Hands-on experiments and projects. Introduction to the professional literature and available resources and to technical writing, speaking, and presentation skills. (Academic year)

2110 **Circuit Theory (4)**

Zaghloul and Staff

Lecture (3 hours), laboratory (3 hours). Circuit elements, techniques of circuit analysis; circuit theorems; operational amplifiers; RLC circuits; natural and step responses; series, parallel and resonant circuits; sinusoidal steady-state analysis; phasers; power calculations; transformers; two-port circuits. CAD tools used in circuit projects.

Corequisite: ApSc 2113, Phys 1022. (Fall and spring)

2115 **Engineering Electronics (4)**

Korman and Staff

Lecture (3 hours), laboratory (3 hours). Solid-state devices used in electronic engineering. Physics of their operation. Application to electronic circuits. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Design concepts through use of SPICE and graphical techniques. Prerequisite: ECE 2110. (Spring)

2140 **Design of Logic Systems I (4)**

Zaghloul and Staff

Lecture (3 hours), laboratory (3 hours). Boolean algebra; combinational and sequential circuits; minimization techniques; design-and-build logic subsystems, such as decoders, multiplexers, adders, and multipliers; use of CAD tools. Corequisite: ECE 2115. (Spring)

2210 **Circuits, Signals, and Systems (3)**

Kyriakopoulos and Staff

Circuit analysis using Laplace transforms; transfer functions; poles and zeroes; Bode diagrams; effects of feedback on circuits; convolution; Fourier series and Fourier

transforms; design of filters; CAD tools used in design of projects. Prerequisite: ECE

2110. (Spring)

2810 **Biomedical Engineering Seminar I–II** (1–1) Loew, Zara, and Staff

–2815 The courses are taken in sequence by students in the biomedical engineering major. Overview of the field of biomedical engineering, including biomechanics, bioinformatics, telemedicine, instrumentation, and medical imaging. (Fall and spring)

3125 **Analog Electronics Design** (4) Korman and Staff

Lecture (3 hours), laboratory (3 hours). Design, testing, and measurement of analog electronic circuits. Differential and multistage amplifiers. Output stages and power amplifiers. Frequency response of amplifiers, high-frequency models of FETs and BJTs. Introduction to feedback circuit topologies. Use of electronic CAD tools, such as P-SPICE. Prerequisite: ECE 2115. (Spring)

3130 **Digital Electronics and Design** (4) Korman and Staff

Lecture (3 hours), laboratory (3 hours). Design and testing of logic gates, regenerative logic circuits, and semiconductor memory circuits. Implementation of such circuits with NMOS, CMOS, TTL, and other integrated circuit technologies. Use of electronic CAD tools, such as SPICE. Prerequisite: ECE 2140. (Fall)

3135 **Design of Logic Systems II** (4) Zaghloul and Staff

Lecture (3 hours), laboratory (3 hours). Introduction of ASIC design techniques; design and programming of FPGAs using CAD tools; timing in sequential circuits; essential

hazards; races in sequential circuits; design-and-build FPGA project. Prerequisite: ECE

2140. (Fall)

3215 Analog Signals and Systems (3)

Zaghloul and Staff

Applications of matrix theory and linear graphs to electrical network analysis; network equations; state-space formulation and solution, Fourier transforms and spectra in electrical systems. Network functions; analysis and synthesis of analog filters, the approximation problem; realization of filters. Prerequisite: ECE 2210, 2115. (Fall)

3220 Introduction to Digital

Kyriakopoulos, Doroslovacki, and Staff

Signal Processing (3)

Signal representation, sampling and quantization, discrete-time signals, z-transforms and spectra, difference equations. Fourier analysis. Discrete Fourier transform, IIR and FIR filter design. Prerequisite: ECE 2210. (Fall)

3225 Signal and Image Analysis (3)

Loew and Staff

Introduction and clinical applications; characteristics of biomedical problems, time- and frequency-domain techniques for signal feature analysis; spectral estimation and analysis; autoregressive modeling; detection and estimation of periodicity; digital images as two-dimensional signals; 2-D Fourier transform. Corequisite: ECE 2210, ApSc

3115. (Fall)

3310 Introduction to Electromagnetics (3)

Lang and Staff

Maxwell's equations, pulse propagation in one dimension, transmission line equations, reflection coefficient, capacitance and inductance calculations, Smith chart, plane waves, reflection from a dielectric of fiber and integrated optics. Prerequisite: ApSc 2113, Phys 1022. (Spring)

3315 Fields and Waves I (3)

Lang and Staff

Complex phasor notation, uniform transmission lines, standing wave ratio, power, reflection coefficient, impedance matching. Review of vector analysis and numerical methods. Electrostatics, generalizations of Coulomb's law, Gauss's law, potential, conductors, dielectrics, capacitance, energy. Prerequisite: ApSc 2113; Phys 1022. (Spring)

3410 Communications Engineering (3)

Doroslovacki and Staff

Fourier series and Fourier transform in relation to signal analysis. Convolution and linear filtering. Signal bandwidth and sampling theorem. Analog modulation. Random variables and stochastic processes; power spectrum. Digital modulation: BPSK, QPSK, MSK. Pulse code modulation, DPCM and delta modulation. Prerequisite: ApSc 3115, ECE 2210.

(Spring)

3415 Introduction to Computer Networks (3)

Subramaniam, Lan, and Staff

Types of networks. Circuit and packet switching. Layered network architectures. Electrical interfaces. Parity checking and CRC error detection codes. Automatic-repeat-request protocols. Routing. Flow and congestion control. Multiple-access protocols. LAN standards. Internetworking and transport layer protocol. Prerequisite: ApSc 3115. (Spring)

3420 Communications Laboratory (1)

Doroslovacki and Staff

Experiments supporting communications systems. Fourier analysis and Fourier transform. Sampling theorem, filtering, and aliasing. Amplitude modulation (AM), frequency modulation (FM), quantization, and pulse code modulation (PCM). Delta modulation. Binary phase shift keying (BPSK). Quadrature phase shift keying (PSK). Prerequisite or corequisite: ECE 3410.

(Spring)

3425 **Data Communications Laboratory (1)** Subramaniam, Lan, and Staff

Experiments in support of the analysis and design of communications systems with emphasis on network protocols. Time and frequency division multiplexing, flow control, automatic repeat request, interfacing, token ring, token bus, multiple access for Ethernet, routing, packet switching. Prerequisite or corequisite: ECE 3415. (Spring)

3430 **Simulation of Communications Systems (3)** Vojcic and Staff

Representation and simulation of deterministic and random signals and systems. Modeling of communication systems; performance measures and statistical methods for the interpretation of simulation results. Simulation techniques and technology in communications. Case studies. Corequisite: ECE 3415 or equivalent. May be taken for graduate credit. (Spring)

3515 **Computer Organization (3)** El-Ghazawi, Subramaniam, and Staff

Structure and operation of a digital computer. Design of computer arithmetic units, data and instruction paths. Microprogramming; memory technology; virtual memory; caches; pipelined computer organization; characteristics of secondary storage; I/O interfacing. Prerequisite: ECE 3135; corequisite: ECE 3525. (Spring)

3520 **Microprocessors: Software, Hardware, and Interfacing (3)** Eom and Staff

Microprocessor architecture, assembly language, address decoding, hardware interrupt, parallel and serial interfacing with various circuits, timer/counters, direct memory access, microprocessor-based system. Hands-on laboratory experience is an integral part of this course. Prerequisite: ECE 2140. (Fall)

3525 **Introduction to Embedded Systems (3)** Eom and Staff

Microcontrollers and their application in embedded systems. Topics include assembly and C for microcontroller programming, serial and parallel I/O interfacing, and multimedia interfacing. Students perform laboratory experiments and a final project to develop a microcontroller-based embedded system. Prerequisite: CSci 1121, ECE 3520. (Spring)

3530 Introduction to Parallel and Distributed Computer Systems (3) El-Ghazawi and Staff

Shared and distributed memory computer systems. Parallel computation. Interprocess communication and synchronization. Terminal, file transfer, and message handling protocols. Algorithms for deadlock detection, concurrency control, and synchronization in distributed systems. Network security and privacy. Resource control and management. Prerequisite: ECE 3515.

(Spring)

3820 Principles and Practice of Biomedical Engineering (4) Loew and Staff

Introduction to engineering principles applicable to medicine; medical measurements for clinical use and research; anatomy and physiology of the human body from system and cellular approaches. Principles of biomedical engineering are reinforced by determining and analyzing physiological measurements in laboratory exercises. Prerequisite: ECE 2110, ApSc 2113.

(Fall)

3910 Capstone Design Preparation (1) Loew, Zara, and Staff

Elements of project design; formulation of project ideas. (Fall)

3915 Electrical, Computer, and Biomedical Engineering Korman and Staff

–4920 Capstone Project Lab I–II–III (1–3–2)

–4925 The courses are taken in sequence by departmental majors beginning in the second semester of the junior year. After an introduction to the formal design process, the student plans, refines, designs, and constructs a one-year project.

(Fall and spring)

4140 **VLSI Design and Simulation (3)** Zaghloul and Staff

Design of VLSI circuits. PMOS and NMOS transistors, switch and gate logic, design rules, CAD system, speed and power considerations, scaling of transistors to the nano-scale, designing with highly variable process parameters. The student will design a VLSI chip and simulate the design. May be taken for graduate credit. Prerequisite: ECE 3130,

3135. (Fall)

4145 **VLSI Fabrication Techniques (3)** Zaghloul and Staff

Modern process technologies associated with various types of processing. Silicon fabrication process, micro- and nanofabrications. Limitation at nano-scale, and other available technologies. Alternatives approach. May be taken for graduate credit. (Spring)

4150 **ASIC Design and Testing of VLSI Circuits (3)** Zaghloul and Staff

ASIC and mixed-signal design methodology, use of ASIC design CAD tools. Logic synthesis, styles of synthesis, power/area/speed constraints. VLSI testing, fault models, design for testability techniques, scan path, built-in self-test. Testing of chips designed in ECE 4140 and of nano-scale circuits. May be taken for graduate credit. Prerequisite: ECE

4140. (Spring)

4155 **Modern Measurements and Sensors (3)** Pardavi-Horvath and Staff

Measurement of dc, ac, and high-frequency signals. Interface electronic circuits. Sensors for measurement of mechanical, optical, magnetic, electromagnetic, thermal,

chemical, and biochemical signals. Prerequisite: ECE 4320, 3125, 2140. May be taken for graduate credit.

(Spring, even years)

4160 Introduction to Nano-electronics (3) Zaghloul and Staff

Technology development beyond CMOS; trends in nano-fabrication and nano-metrology. Current flow in 1-D, 2-D, and 3-D electronic structures and their energy levels. Nano-structures such as nano-wire (Silicon or other material), Carbon Nano Tube (CNT), and Graphene. Nano-scale transistors. Prerequisite: ECE 2115. (Fall)

4320 Fields and Waves II (3) Lang and Staff

Magneto-stationary fields, Lorentz force torques, Biot–Savart law, Ampere’s law, magnetic materials, inductance, energy. Maxwell’s equations, Faraday’s law, charge–current continuity, vector potential. Time-harmonic fields, plane waves, polarization, skin effect, dielectric boundaries, and fiber optics. Radiation, dipole, gain, effective area. Prerequisite: ApSc 2114, ECE 3315. (Fall)

4325 Microwave and Optics Laboratory (1) Lang and Staff

Experiments in transmission lines, network analyzer measurements of scattering parameters, microwave systems, fiber-optic systems and antennas. Introduction to the characteristics of laser and optical systems. Prerequisite: ECE 4320. (Spring)

4435 Fiber Optical Communication (3) Pardavi-Horvath and Staff

Lightwave fundamentals. Integrated optics. Optical fiber waveguides. Light sources and detectors. Distribution networks and fiber components. Modulation. Noise and detection. System design. Prerequisite: ApSc 2114; ECE 3310 or 4320. (Fall, odd years)

4535 Computer Architecture and Design (3) El-Ghazawi and Staff

Design of bus-based digital computer systems, memory subsystems, caches, and multiple processors. Comparison of RISC and CISC processors and standard buses. Bus transfer and control signals. Performance, memory management, architectural support for protection, task switching, exception handling, instruction pipelines. Prerequisite: ECE 3515. (Fall)

4610 Electrical Energy Conversion (3) Harrington and Staff

Three-phase and single-phase AC rotating machines and transformers, DC machines, rotating machines as circuit elements, power semiconductor converters. Renewable generation, utility grid integration, smart grid applications. May be taken for graduate credit by students in fields other than electrical engineering. Prerequisite: ECE 2210, 3315. (Spring)

4615 Electrical Power Laboratory (1) Harrington and Staff

Experiments in support of the analysis and design of electrical power systems. Measurements of the characteristics of devices to generate electric power. Rectification and inversion processes for power systems and drives. Prerequisite or corequisite: ECE 4610. (Fall)

4620 Electrical Power Systems (3) Harrington and Staff

AC power grids, transmission line parameters, load flow, economic dispatch voltage, frequency and power flow control. Voltage, current and power limitations. Fault analysis and stability considerations. Effect of independent power producers and variable energy sources and energy storage. May be taken for graduate credit. (Fall)

4625 Power Electronics and Applications (3) Harrington and Staff

Review of power semiconductors and applications to electronic power supply, frequency control, uninterruptible supplies, and HVDC power transmission. May be taken for graduate credit. Corequisite: ECE 4610. (Spring)

4710 Control Systems Design (3) Carroll and Staff

Mathematical models of linear systems; steady-state and transient analyses; root locus and frequency response methods; synthesis of linear feedback control systems. Prerequisite: ApSc 2114, ECE 2210 or MAE 3134. (Fall)

4715 Control Systems Laboratory (1) Carroll and Staff

Experiments in support of control theory, involving the use of the digital computer for process control in real time. Design of feedback and compensation with computer implementation. Digital simulation of linear and nonlinear systems. Prerequisite or corequisite: ECE 4710. (Fall)

4730 Robotic Systems (3) Carroll and Staff

Modeling and analysis of robot designs. Kinematics of mechanical linkages, structures, actuators, transmissions, and sensors. Design of robot control systems, computer programming, and vision systems. Use of artificial intelligence. Current industrial applications and limitations of robotic systems. Same as MAE 3197. Prerequisite: computer programming, ApSc 2058, ECE 4710. (Spring)

4735 Robotics Laboratory (1) Carroll and Staff

Experiments illustrating basic principles and programming of robots and other automated machinery. Design and writing of computer programs to use a robot's arm, vision, and data files to accomplish tasks. Prerequisite or corequisite: ECE 4730/MAE 3197. (Spring)

4820 **Anatomy and Physiology for Engineers (3)** Loew and Staff

Human anatomy and physiology from an engineering viewpoint. Analysis of functions of major physiological systems. Biopotentials, mechanics, gas exchange, chemical balance, electrical and chemical signaling, nervous control, voluntary and reflex factors. (Fall)

4830 **Introduction to Medical Imaging Methods (3)** Zara and Staff

Common imaging modalities, including ultrasound, X-ray, MRI, CT, SPECT, and PET. Overview of linear systems, basic properties of an imaging system, the physics and instrumentation behind each modality, and their respective advantages, disadvantages, and applications. May be taken for graduate credit. Prerequisite: ECE 3220, 3820. (Spring)

4835 **Introduction to Telemedicine (3)** Loew and Staff

Clinical applications; data dimensionality, acquisition, and conversion; transmission methods (wired, wireless); networking; compression; measurement of quality and accuracy; reception and display considerations; data archiving and retrieval; economic issues; user-interface considerations. Prerequisite: ECE 3220; corequisite: ApSc 3115. (Fall)

4980 **Special Topics (1 to 3)** Staff

Topic to be announced in the Schedule of Classes. (Fall and spring)

4990 **Research (1 to 3)** Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

ENGINEERING MANAGEMENT AND SYSTEMS ENGINEERING

Professors E.L. Murphree, Jr., H. Eisner, S. Sarkani, T.A. Mazzuchi (*Chair*), J.P. Deason,

J.R. van Dorp

Associate Professors M.R. Duffey, H. Abeledo, J.A. Barbera, G.L. Shaw, J.J. Ryan

Assistant Professors J.R. Santos, R.A. Francis, Z. Szajnfarber, E. Gralla

Professorial Lecturers J.W. Harris, Jr., D. Gallay, M. Scullin, K. Robertory, C.

Mirchandani, R. Lieberman

See the School of Engineering and Applied Science for the programs of study leading to the Bachelor of Science with a major in systems engineering and Bachelor of Arts with a major in applied science and technology.

1001 **Introduction to Systems Analysis** (1) Mazzuchi and Staff

A survey of several aspects of systems analysis, including methodologies such as linear programming, network models, probability, and queuing theory, with applications to resource allocation, decision making, and statistical analysis. Spreadsheet and laboratory exercises and projects.

(Fall)

2705 **Mathematics in Operations Research** (3) Abeledo and Staff

Mathematical foundations of optimization theory; linear algebra, advanced calculus, convexity theory. Geometrical interpretations and use of software. Prerequisite: Math 2233. (Spring)

2801 **Fundamentals of Systems Engineering** (3) Duffey

General introduction to systems engineering processes applied to designing, building, and operating complex engineering systems. Case studies and methodologies used for government and industry projects.

3701 **Operations Research Methods** (3) Abeledo and Staff

Deterministic and stochastic methods. Optimization algorithms: Simplex method, Branch and Bound, combinatorial algorithms, heuristic methods. Optimization theory:

convexity, duality, sensitivity analysis. Stochastic optimization: marginal analysis, Markov chains, Markov decision processes. Prerequisite: ApSc 3115 and EMSE 2705, or permission of instructor. (Spring)

3740 **Systems Thinking and Policy Modeling I (3)** Santos and Staff

Introduction to systems thinking and the system dynamics approach to policy analysis, with applications to business management and public policy. Causal-loop and stock and flow models of business growth, technology adoption, and marketing. Use of role-based games to explain key principles of systems. Use of simulation software to model problems and case studies.

(Fall)

3760 **Discrete Systems Simulation (3)** van Dorp and Staff

Simulation of discrete stochastic models. Simulation languages. Random-number/random-variate generation. Statistical design and analysis of experiments, terminating/nonterminating simulations; comparison of system designs. Input distributions, variance reduction, validation of models.

Prerequisite: ApSc 3115; CSci 1121, 1041, or 1111; or permission of instructor. (Spring)

3815 **Requirements Analysis and Elicitation (3)** Santos and Staff

The process of translating and decomposing systems engineering objectives into measurable and tractable requirements. How requirements analysis supports general processes and standards through elicitation methods, requirements decomposition, traceability matrices, and systems requirements specifications. (Fall and spring)

3850 **Quantitative Models in Systems Engineering (3)** Abeledo and Staff

Quantitative modeling techniques and their application to decision making in systems engineering. Linear, integer, and nonlinear optimization models. Stochastic models: inventory control, queuing systems, and regression analysis. Elements of Monte Carlo and discrete event system simulation. Prerequisite: ApSc 3115. (Fall)

3855 Critical Infrastructure Systems (3)

Francis

A survey of major topics in engineered infrastructure systems, such as asset management, environmental impact analysis, input–output life cycle analysis and inoperability modeling, infrastructure risk and reliability analysis, resilience and resistance to natural hazards or service disruptions, and development of infrastructure sustainability metrics. (Spring)

4191 Systems Engineering Senior Project (3)

Duffey, Mazzuchi, and Staff

Field experience in systems engineering on a team basis. Each small group confronts an actual problem and formulates a solution using systems engineering methods and models. Oral and written reports. Prerequisite or corequisite: EMSE 4710, 4765, 3760, 4755. (Spring)

4197 Special Topics (1–3)

Staff

May be repeated for credit provided the topic differs.

4198 Research (1 to 3)

Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

4410 Survey of Finance and Engineering Economics (3)

Duffey and Staff

Survey of material relevant to financial decision-making for engineering activity. Includes traditional engineering economy topics; fundamentals of accounting; and financial

planning, budgeting, and estimating applicable to the management of technical organizations. (Fall, spring, and summer)

4710 **Applied Optimization Modeling** (3) Abeledo and Staff

Analysis of linear, integer, and nonlinear optimization models of decision problems that arise in industry, business, and government. Modeling techniques and applications; use of optimization software to solve models. Prerequisite: EMSE 3850 or permission of instructor. (Fall)

4755 **Quality Control and Acceptance Sampling** (3) Mazzuchi, Francis, and Staff

Statistical approaches to quality assurance. Single and multivariate control charts, acceptance sampling by attributes and variables, process capability and design of experiments. Prerequisite: ApSc 3115 or permission of instructor. (Spring)

4765 **Data Analysis for Engineers and Scientists** (3) Mazzuchi, van Dorp

Design of experiments and data collection. Regression, correlation, and prediction. Multivariate analysis, data pooling, and data compression. Model validation. Prerequisite: ApSc 3115. (Fall and spring)

ENGLISH

Professors C.W. Sten, D. McAleavey, O.A. Seavey, A. Romines, J.A. Miller, J. Shore, F.

Moskowitz, M. Alcorn, J.J. Cohen, J.G. Harris, K. Moreland, S. Knapp, R.L. Combs,

G. Wald, T.G. Wallace, M. Frawley, R. McRuer (*Chair*), T.V. Mallon, E. Schreiber

Associate Professors G. Carter, D. Moshenberg, M.S. Soltan, J.M. Green-Lewis, P. Cook,

P. Chu, P. Griffith, J.C. James, K. Daiya, A. Huang, H. Dugan, A. López

Assistant Professors J. Hsy, H.G. Carrillo, D. DeWispelare

Adjunct Professors A.C. Stokes, S. Goswami

Jenny McKean Moore Writer in Washington B. Snider

Bachelor of Arts with a major in English—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Either a course in the Engl 1300s or one of the following two-course sequences: Engl 1410–11, 1830 and 1840, 1510–11, 1610–11, or 1710–11.
3. Required courses in related areas—second-year proficiency in a single foreign language, as demonstrated by completion of four semesters of college-level language study or the equivalent. (In the case of Latin, Latn 2001 is sufficient.)
4. Required for the major—33 credit hours of upper-division English courses, including (a) two courses in literature before 1700; (b) two courses in literature between 1700 and 1900; (c) one course in literature after 1900; (d) one course in minority/postcolonial literature; and (e) Engl 2800 and an additional course in literary theory and/or cultural studies.

With departmental approval, courses with appropriate subject matter may be substituted for those specified above. A single course may fulfill only one requirement.

Beyond the eight courses in specified areas listed above, students take three additional upper-division English courses, which may be in creative writing. With approval of the English Department, two courses in the literature of a foreign language (either in the original language or in translation) may be substituted for English electives.

Special Honors—Majors in English who wish to be considered for Special Honors must apply in writing in the spring semester of the junior year; they must meet the

requirements stated under University Regulations and have a GPA of 3.25 in courses in the English Department at the time of applying. Candidates take Engl 4040 in the fall semester of the senior year and Engl 4250 in the spring semester. To be eligible for graduation with Special Honors, candidates must earn an *A* or *A–* on the Honors Thesis and have achieved a 3.4 grade-point average in courses in the English Department.

Bachelor of Arts with a major in English and creative writing—Except for the requirement of a creative thesis, this major closely resembles the curriculum that is followed by an English major pursuing a creative writing minor. Admission to the major is restricted, and a separate application must be filed in writing prior to the senior year. No more than two students per thesis director are accepted per year.

The major in English and creative writing requires 39 credits of upper-division English courses, matching items 1 through 4(e) indicated under the Bachelor of Arts with a major in English, with the additional requirements of six creative writing courses, including Engl 4220; three upper-division courses must normally be in a single genre.

Bachelor of Arts with a major in dramatic literature—The Department of Theatre and Dance and the Department of English offer an interdisciplinary major in dramatic literature. See Dramatic Literature.

Combined Bachelor of Arts/Master of Arts in the field of English—Interested students should consult a departmental advisor early in their junior year.

Minor in English—The prerequisite course(s) stated in item 2 under the major in English and five upper-division literature courses, chosen in consultation with an advisor in the department.

Minor in creative writing—The prerequisite course(s) stated in item 2 under the major in English and six English Department courses, of which five must be in creative writing, including at least three in poetry (Engl 2470, 2570, and 3370 or 3380) or three in fiction (Engl 2460, 2560, and 3360 or 3380) or two in playwriting (Engl 2250, 3250).

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: The department strongly recommends a literature course, such as Engl 1310 through 1711 or 1830 or 1840, as a prerequisite to upper-division English courses. All creative writing courses are limited to 15 students. Two creative writing courses in the same genre may not be taken during the same semester.

1210 **Introduction to Creative Writing (3)** Mallon and Staff

An exploration of genres of creative writing (fiction, poetry, and/or playwriting).
Basic problems and techniques; examples of modern approaches; weekly writing assignments; workshop and/or conference discussion of student writing. (Fall and spring)

1310 **Critical Readings (3)** Wald, Cohen

An introduction to the study of literature in English from a global perspective. May be repeated for credit provided the topic differs.

(Fall and spring)

1320 **Literature of the Americas (3)** López and Staff

American literature considered in a transhemispheric framework as writing that probes and spans the boundaries of the nation, connecting the United States to the rest of the Americas and to other parts of the globe.

1330 **Myths of Britain (3)** Cohen and Staff

Why much great English literature turns out not to be so English after all.

The early literature of the island within a transnational frame. Readings range from *Beowulf* to Arthurian myths to Shakespeare.

1340 **Shakespeare's Globe (3)** Dugan, Huang, and Staff

Links between Shakespeare's geographical and theatrical "Globes." How did Shakespeare and his company represent racial, cultural, and linguistic difference in the Globe? What place did they imagine for England and Europe in this newly globalized world?

1410–11 **Introduction to English Literature (3–3)** Staff

Representative works by major British authors studied in their historical context; discussion of recurrent themes and introduction to various types and forms of imaginative literature. Engl 1410; Middle Ages through the 18th century. Engl 1411: 19th and 20th centuries. (Academic year)

1510–11 **Introduction to American Literature (3–3)** Seavey, Combs,
Moreland, and Staff

Historical survey. Engl 1510: From early American writing through Melville, Whitman, and Dickinson. Engl 1511: From Twain, James, and Crane to the present. (Academic year)

1610–11 **Introduction to Black American Literature (3–3)** James, Miller, Wald

Survey of several genres of African American literature. Engl 1610: from the 18th through the late 19th centuries, in such cultural contexts as the developing concept of "race." Engl 1611: from the early 20th century to the present day, in such cultural contexts

as the “new Negro” Renaissance and the civil rights and Black Power movements. (Academic year)

1710–11 **Introduction to Postcolonial Literature** (3–3) Daiya and Staff

Introduction to postcolonial literature from the perspectives of colonizer and colonized in Great Britain, India, Pakistan, Bangladesh, Sri Lanka, Australia, New Zealand, Canada, Anglophone Africa, and the Caribbean region; literature written on the wing, in diaspora. (Academic year)

1830 **Tragedy** (3) Carter

Modes of tragedy as developed in drama, nondramatic verse, and prose fiction in literature from ancient to modern times—Book of Job to Beckett. (Fall and spring)

1840 **Comedy** (3) Staff

Modes of comedy as developed in drama, nondramatic verse, and prose fiction—Chaucer to Borges. (Fall and spring)

2240 **Play Analysis** (3) Staff

Same as TrDa 2240. Traditional and nontraditional (Aristotelian and non-Aristotelian) approaches to the analysis of dramatic literature; literary and theatrical techniques used by playwrights. (Spring, odd years)

2250 **Dramatic Writing** (3) Griffith

Same as TrDa 2250. A workshop in playwriting and screenwriting, with emphasis on dramatic structure. Recommended preparation: Engl 1210 and two semesters of literature courses. (Fall)

2460 **Fiction Writing** (3) Mallon, Moskowitz, Griffith, Carrillo, and Staff

The writing of fiction. Recommended preparation: Engl 1210 and two semesters of literature courses. (Fall and spring)

2470 **Poetry Writing (3)** McAleavey, Shore, and Staff

The writing of poetry. Recommended preparation: Engl 1210 and two semesters of literature courses. (Fall and spring)

2560 **Intermediate Fiction Writing (3)** Mallon, Moskowitz, Carrillo

The writing of fiction. Prerequisite: Engl 2460 or equivalent.

(Fall and spring)

2570 **Intermediate Poetry Writing (3)** McAleavey, Shore, Pardlo

The writing of poetry. Prerequisite: Engl 2470 or equivalent.

(Fall and spring)

2800 **Critical Methods (3)** Staff

The topics and techniques of literary analysis, applied to English and American poetry, prose fiction, and drama. Attention to stylistic and structural analysis, narratology, and critical theory applied to specific literary texts. (Fall and spring)

3240 **Introduction to Dramaturgy (3)** Staff

Same as TrDa 3240.

3250 **Intermediate Dramatic Writing (3)** Griffith

Same as TrDa 3250. A workshop developing scripts for both theatre and film.

Prerequisite: Engl 2250 or equivalent. May be repeated for credit with departmental approval. (Spring)

3360 **Advanced Fiction Writing (3)** Mallon, Moskowitz, Carrillo

Further workshop study of the writing of fiction. Prerequisite: Engl 2560 or equivalent. May be repeated for credit with departmental approval.

(Spring)

3370 **Advanced Poetry Writing** (3) McAleavey, Shore

Further workshop study of the writing of poetry. Prerequisite: Engl 2570 or equivalent. May be repeated for credit with departmental approval. (Fall)

3380 **Creative Writing Workshop** (3)

Taught by the Jenny McKean Moore Writer in Washington; for undergraduates and graduate students. Prerequisite: an upper-division creative writing course. May be repeated for credit if taught by a different instructor. (Fall and spring)

3390 **Topics in Creative Writing** (3) Mallon, McAleavey, Moskowitz,

Shore, Griffith, Carrillo

Topics announced prior to the registration period; may be repeated for credit provided the topic differs. Topics may include poetry and poetics; forms and methods in fiction; forms and methods in poetry; memoir and personal narratives; creative nonfiction; “Literature, Live!”; avant-garde and experimental writing.

3410 **Chaucer** (3) Cohen, Hsy

Chaucer’s major works seen as exciting, lively texts from the modern perspective and as products of specific economic, social, and cultural trends of the late 14th century. Focus on *The Canterbury Tales*, read in the original Middle English.

3420 **Medieval Literature** (3) Cohen, Dugan, Hsy

Readings from a wide range of medieval genres, including romances, saints' legends, mystical narratives, lyrics, civic drama, and social satires. How these texts responded to and shaped changing patterns of medieval culture, as the clergy, the aristocracy, and the urban bourgeoisie attempted to define a culture of their own.

3430 **The English Renaissance** (3)

Harris, Cook, Dugan

Verse and prose written in the period 1515–1625, examined in relation to cultural practices and social institutions that shaped English life. More, Sidney, Spenser, Shakespeare, Donne, Jonson, Bacon, Herbert, many others.

3440–41 **Shakespeare** (3–3)

Harris, Dugan, Cook, Huang

Close study of six or seven plays each semester, with emphasis on the texts in history and ideology. Attention to current critical practices (feminist, materialist, psychoanalytic), modern performance practice, and Shakespeare as a cultural institution. (Academic year)

3450 **Topics in Shakespeare Studies** (3)

Cook, Harris, Dugan, Huang

Critical study of a particular aspect of Shakespeare's work, or of a distinctive approach to the plays. Projected topics: Shakespeare on film, the history plays and Elizabethan England, 18th-century rewritings of Shakespeare, Shakespeare as poet, cultural materialist readings of Shakespeare.

3460 **Milton** (3)Cook

Study of the major works in verse and prose, following the course of Milton's career. (Spring)

3470–71 **English Drama** (3–3)

Cook, Harris, Dugan

Engl 3470: Shakespeare's contemporaries. Engl 3471: Historical survey, 1660 to present.

3480–81 **The 18th Century (3–3)**

Wallace, Seavey

Readings in significant 18th-century English and Continental writers—Dryden, Swift, Pope, Johnson, Montesquieu, Voltaire, and others—with emphasis on tracing the ways in which literary texts contain, perpetuate, and subvert social and political ideologies.

3490 **Early American Literature and Culture (3)**

Seavey

The shaping of America's early literary and cultural traditions as shown by significant writers of the colonial and early national periods: Bradstreet, Cotton Mather, Edwards, Franklin, Crèvecoeur, and others. (Fall)

3510 **Children's Literature (3)**

Staff

Nineteenth- and twentieth-century children's texts that illuminate the several worlds of childhood: the "small world" of childhood perception, the larger world of social and historical forces, and the "secondary world" of fantasy.

3520 **American Romanticism (3)**

Sten, Seavey

The shaping of America's literary and cultural traditions as shown by significant writers of the Romantic era: Poe, Emerson, Hawthorne, Melville, Thoreau, Whitman, Dickinson, and others. (Spring)

3530 **The Romantic Movement (3)**

DeWispelare

Major figures and topics in English and Continental romanticism: Blake, Wordsworth, Coleridge, Lamb, Byron, Shelley, Keats, Hazlitt, DeQuincey, and others.

3540–41 **Victorian Literature (3–3)**

Carter, Frawley, Green-Lewis

Engl 3540: 1830–1865—E. Brontë, Dickens; Tennyson, Browning, Arnold; Darwin, Carlyle, Ruskin. Engl 3541: 1865–1900—Eliot, Hardy, Conrad; Swinburne, the Rossettis, Morris; Pater, Wilde, the Nineties.

3550–51 **The English Novel (3–3)**

Wallace, Frawley

Engl 3550: The 18th century—Defoe, Richardson, Fielding, Sterne, and others. Engl

3551: The 19th century—Austen, the Brontës, Dickens, George Eliot, Hardy, and others.

3560 **American Realism (3)**

Romines

The shaping of America's literary and cultural traditions as shown by significant writers of the Realist school: Twain, James, Crane, Howells, Wharton, Chopin, Robinson, and others. (Fall)

3570 **19th-Century Black Literature (3)**

James

Studies in 19th-century black literature of the Americas and the transatlantic. Writing from the United States, Latin America, the Caribbean, Britain, and Africa may be included. Topics and emphasis may vary.

3610 **Modernism (3)**

Soltan, Green-Lewis

The emergence of modernist experimentation (and the sense of epistemological and moral crisis it expressed) in the poetry and prose of Pound, T.S. Eliot, Woolf, Kafka, and others.

3620–21 **American Poetry (3–3)**

Combs, McAleavey

Close examination of major American poems. Engl 3620: From the beginnings to the early 20th century: works by Poe, Emerson, Whitman, Dickinson, and others. Engl 3621: Since the early 20th century: Frost, Eliot, Stevens, Bishop, Hughes, Ashbery, and others.

3630–31 **American Drama (3–3)**

Combs

Engl 3630: 19th-century melodrama and the emergence of realism; works by O'Neill and other dramatists of the early 20th century. Engl 3631: Developments in modern

American drama since World War II, including works by Williams, Miller, Albee, Shepard, Rabe, Guare, Mamet, Henley, Wasserstein, Shange, Hwang, Wilson, and others.

3640–41 **The American Novel (3–3)** Moreland, Romines, Sten

Historical and critical study of major works in the American novelistic tradition. Engl 3640: From the beginnings through the 19th century: Hawthorne, Melville, James, Twain, Dreiser, and others. Engl 3641: The 20th century: Wharton, Cather, Anderson, Hemingway, Fitzgerald, Faulkner, Wright, R.P. Warren, Nabokov, and others.

3650 **The Short Story (3)** Combs, Soltan

An extensive survey of short fiction by a wide variety of writers of the 19th and 20th centuries, about half of them American; readings on the art of the short story by writers and literary critics.

3660–61 **20th-Century Irish Literature (3–3)** Soltan and Staff

Irish writers from the time of the literary revival in the late 19th century to the present. Engl 3660: Yeats and other Irish poets and playwrights of his time and after—Synge, O’Casey, Kavanagh, Heaney, and others. Engl 3661: Joyce through *Ulysses* and other fiction writers of later generations—O’Brien, Beckett, and others.

3710 **Contemporary Drama (3)** Griffith

Examines drama written since 1960 in the light of postmodernism as both a literary and a theatrical theory. Explores the ways contemporary playwrights and directors challenge the perceptions and assumptions of today’s audience.

3720–21 **Contemporary American Literature (3–3)** Chu, Moreland, Soltan

Historical, critical, and theoretical study of American literature since the 1960s.

Various authors and genres.

3730 **Topics in Postcolonial Literature** (3) Daiya

Historical, critical, and theoretical study of post-colonial literatures—African, Asian, Commonwealth—written in English. Topics vary with instructor; may be repeated for credit provided the topic differs.

3810 **Selected Topics in Literature** (3) Staff

Topics announced in the Schedule of Classes; may be repeated for credit provided the topic differs. Topics may include the Bloomsbury group; southern literature; the picaresque; literature of the Holocaust; literature and politics; Freud, Dostoevsky, and Shakespeare.

3820 **Major Authors** (3) Staff

In-depth studies of a single figure or two or three authors (of British, American, or other nationality) who have written in English. Topics announced in the Schedule of Classes; may be repeated for credit provided the topic differs.

3830 **Topics in Literary Theory/Cultural Studies** (3) Staff

Selected topics in the diverse theoretical methodologies and interdisciplinary studies that characterize contemporary English and American literary studies. May be repeated for credit provided that topic differs.

3840 **Gender and Literature** (3) Romines, Wald, McRuer, Chu

Symbolic representations of culturally defined roles and assumptions in literature. Male and female gender roles as fundamental to culture; the representation of culture, in literature especially and in the arts and humanities generally. May be repeated for credit provided the topic differs.

3850 **Ethnicity and Place in American Literature** (3) Chu, Miller, James, López

The relationships among ethnic identity, authorship, regional setting, and national consciousness. Differences in the literary culture of ethnically, racially, and regionally diverse American populations; how considerations of ethnicity and place have been reshaping the American literary canon. Texts and emphases vary with instructor.

3860 **Topics in the History of the English Language** (3) Hsy, Carillo, López

The cultural and literary functions of English across time and space. Scope and methodology vary by instructor. Topics may include language and identity, theoretical and linguistic approaches to language, multilingualism, diasporic writing, or history and periodization.

3910 **Disability Studies** (3) McRuer and Staff

Consideration of cultural texts that illustrate or illuminate issues of ability and disability—terms that extend the prism through which human experience may be understood. May be repeated once for credit provided the topic differs.

3920 **U.S. Latina/o Literature and Culture** (3) López, Carillo, and Staff

Introduction to the basic texts in the Chicana/o, Cuban-American, Dominican-American, and Puerto Rican literary and cultural traditions. Works by U.S. writers of Central American origin are discussed as well.

3930 **Topics in U.S. Latina/o Literature and Culture** (3) López, Carillo, and
Staff

In-depth exploration of a critical issue in the field of Latina/o literary and cultural studies. Topics may include ideologies of literary recovery, transnationalism and diaspora, blackness and *latinidad*.

3940 **Topics in African American Literary Studies (3)** James, Miller, Wald

Intensive study of a single aspect of African American literature: major authors, genre, theme, movement. Substantial attention to the critical tradition.

3945 **African American Poetry (3)** James and Staff

Topics in African American poetry from the Black Atlantic through contemporary spoken word and web-based experiments in hypertext composition. Topics vary. Possible topics may be Langston Hughes, Gwendolyn Brooks, poetry manifestoes, poetry and social justice, or eco-poetics of the black experience.

3950 **Cultural Theory and Black Studies (3)** James, Miller, Wald

Selected topics in critical and cultural theories—often interdisciplinary—as used in understanding African American literature and culture. Topics may include genre, medium, period, social change, and leading contemporary African American thinkers/writers.

3960 **Asian American Literature (3)** Chu

How Asian American writers construct their identities in dialogue with shifting ideas of “America.” Asian American history, gendering subjects, orientalism and postcolonial subjectivity, interracial relations, canonization. Representative writers: Kingston, Hwang, Jen, Chang-rae Lee, Ondaatje, Lahiri, Bulosan, Hagedorn.

3965 **Topics in Asian American Cultural Studies (3)** Chu

Consideration of Asian American literature as a tradition that questions mainstream constructions of Asian American race and ethnicities, provides alternative accounts of Asian American experiences, and examines how Asian American literature is becoming a global literature with global concerns.

3970 **Jewish American Literature (3)** Moskowitz

One hundred years of Jewish American writing in fiction, autobiography, poetry, drama, and non-fictional prose. The immigrant experience, American philosemitism and antisemitism, the Holocaust and after, the New York intellectuals, Jewish feminism, and the patriarchal tradition.

3980 **Queer Studies (3)**

McRuer and Staff

Examination of literature and culture in the context of the history and experience of lesbian, gay, bisexual, and transgendered people, with consideration of sexual identity as a core component of human experience. May be repeated once for credit provided the topic differs.

3990 **Literary Studies Workshop (1)**

Staff

Introduction to advanced research and writing in literature. Open only to second-semester juniors, except that students who plan study abroad in their junior year may take the course as sophomores.

4020 **Studies in Contemporary Literature (1 to 3)**

Staff

4040 **Honors Seminar (3)**

Harris

Genre and genre theory; literature as cultural artifact and as instrument of cultural criticism; various critical approaches—ideological, historical, and ahistorical. Open only to first-semester senior honors candidates in English.

(Fall)

4135 **Folger Seminar (3)**

Staff

The history of books and early modern culture. Use of the archive at the Folger Shakespeare Library. Students must obtain departmental approval in the preceding semester. Same as Hist/Fren 4135.

4220 Creative Writing Senior Thesis (3)

Mallon and Staff

Under the guidance of an instructor, the student composes an original manuscript of poetry or short fiction accompanied by an essay situating the student's work in the contemporary context. Open only to seniors admitted to the English and creative writing major. (Fall and spring)

4250 Honors Thesis (3)

Staff

Under the guidance of an instructor, the student writes a thesis on an approved topic. Open only to senior honors candidates in English.

(Fall and spring)

4360 Independent Study (3)

Cohen and Staff

For exceptional students, typically majors, whose academic objectives are not accommodated in regular courses. Students must obtain departmental approval and arrange for supervision by an appropriate member of the faculty. (Fall and spring)

4470 Internship (1 to 4)

Staff

Position of responsibility with a publication, educational project, firm, or cultural organization offering practical experience in research, writing, editing, etc. Restricted to junior and senior English majors; approval of supervising faculty required for registration. May be repeated for credit; a maximum of 3 credits may be counted toward the English major. *P/NP* grading only.

ENGLISH FOR ACADEMIC PURPOSES

Director of the Language Center S. Hamano

1015 American Multicultural Perspectives

Siczek and Staff

in Washington, D.C. (3)

A writing-intensive course that explores the capital's rich multicultural heritage through diverse texts and community resources. Designed to represent the pedagogy of the American university experience through critical reading, inquiry, and discussion. Upon successful completion of EAP 1015, students take UW 1020. Laboratory fee.

1016 Academic Skills Workshop (1)

Siczek and Staff

Development of critical academic skills for international students. Workshop topics may include critical reading, listening and note-taking, academic vocabulary development, timed writing practice, and discussion and presentation skills. (Summer)

1046 EAP Tutorial (0 to 4)

Staff

Individualized instruction in specific skill areas. Language Center approval required. Tuition is charged at the rate of 1, 2, 3, or 4 credits, for 1, 2, 3, or 4 hours of instruction per week, respectively. Credit for this course cannot be applied toward a degree.

ENVIRONMENTAL STUDIES

Director D. Rain

Columbian College of Arts and Sciences offers an interdisciplinary program in environmental studies leading to the degree of Bachelor of Arts. Housed in the Department of Geography, the major combines courses drawn from biological sciences, geological sciences, and geography, as well as American studies, anthropology, economics, English, history, public health, religion, sociology, and statistics.

Bachelor of Arts with a major in environmental studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Prerequisite courses—BiSc 1005–6 or 1111–12; Geol 1001 and 1002, or 1002 and 1005; Geog 1002 and 1003.

3. Required courses for the major—24 credits chosen from designated courses in the areas of environmental techniques and assessment, environmental processes, and environment and society. Lists of courses that may be chosen to fulfill the areas are available in the Department of Geography; a minimum of two courses must be selected from each area. In addition to the 24 credits of area courses, a 3-credit field course must be chosen from BiSc 3456 or 2458, Geol 4195, and Geog 2196.

EXERCISE SCIENCE

Professors L. DiPietro (*Chair*), L. Hamm, J. Danoff, J. DeLoia

Associate Professors B.J. Westerman, T. Miller

Assistant Professors A. Visek, M. Barron, J. Gutierrez, G. Hudson

See the School of Public Health and Health Services for the program of study leading to the Bachelor of Science with a major in exercise science. Most of the exercise science and the health and wellness courses that follow are available to undergraduates in other schools and may be used toward a secondary field in exercise science or in health and wellness.

EXERCISE SCIENCE

1050 Emergency Procedures and Safety Skills (2)

Introduction to common safety principles, predisposing factors and common causes of accidents, injuries, and illnesses. The course includes American Red Cross Professional Rescuer and Automated External Defibrillator certification. Laboratory fee.

1101 Special Topics (1 to 3)

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

1103 Professional Foundations in Exercise Science (3)

Nature, scope, and scientific basis of exercise science: orientation to professional competencies and opportunities.

1110–11 Applied Anatomy Physiology I–II (4–4)

Fundamentals of human anatomy and physiology for students preparing for health sciences professions. Emphasis on bones, joints, muscles, innervation, and blood supply. Laboratory fee. ExSc 1110 is prerequisite to ExSc 1111.

1112 Current Issues in Coaching (3)

Trends and issues in athletics, sport, and coaching. Concepts from both theoretical and applied perspectives.

1114 Community Nutrition (3)

Introduction to community nutrition and public health programs offered on the local, state, national, and international levels, targeting both individuals and groups. Topics include nutrition assessment, health policies, nutrition programs, and principles of nutrition education.

1117 Principles of Coaching (3)

Study of coach/athlete behavioral patterns and interactions, coaching methods, and interdisciplinary principles applicable to coaching.

1118 Sport and Nutrition (3)

The nutrition needs for recreational exercise and sports; skills in assessing nutrition needs; development of individual nutrition programs that are sport/activity-specific; and

identification and correction of nutrition problems affecting sports performance.

Prerequisite: HLWL 1116 or ExSc 2119.

1119 Children and Sport (3)

Psychomotor, psychosocial, and physiological factors of children's participation in sports. The importance of sport to children, readiness to compete, adaptations to training, participation motives, social factors, fundamentals of training, nutrition, stress, and child protection. Theoretical aspects applied in a variety of sports settings.

2110 Prevention and Care of Injury (3–4)

Information and practical experience in preventing, recognizing, and treating injuries that occur in physically active individuals. Prerequisite: ExSc 1110–11 or equivalent.

2111 Exercise Physiology I (4)

The physiological functions of the body and the effect of exercise on these functions.

Prerequisite: ExSc 1110–11. Laboratory fee.

2112 Exercise Physiology II (4)

How the physiological systems of the body respond to acute and chronic exercise; neuromuscular adaptations to exercise. Exercise training program design, training in extreme environmental conditions, and training considerations for special populations.

Prerequisite: ExSc 2111. Laboratory fee.

2113 Kinesiology (4)

Analysis of human movement with emphasis on the biomechanics of exercise and sport movement patterns. Prerequisite: ExSc 1110–11 or equivalent, an approved course in anatomy.

2114 Nutrition Sciences I (3)

How the macronutrients (fat, carbohydrate, and protein) are digested, absorbed, and metabolized. Other topics include alcohol metabolism, weight management, body composition, and macronutrient metabolism in exercise. Prerequisite: BiSc 1111–12, ExSc 1110–11.

2115 Nutrition Sciences II (3)

How the micronutrients (vitamins and minerals) are digested, absorbed, and metabolized. Other topics include hydration, the role of phytochemicals in the diet, and the effect of exercise on micronutrient requirements. Prerequisite: ExSc 2114.

2116 Exercise and Health Psychology (3)

The relation of behavioral factors to health and disease. The role of physical activity in the prevention of chronic disease and disability. Health behavior theories and cognitive behavioral approaches to health behavior change.

2117 Exercise and Sport Psychology (3)

Study of psychological aspects of sport participants, athletes, teams, and competition in sport situations, including personality, motivation, performance level, achievement, and behavioral change strategies; social factors, training events, and measurement techniques. Prerequisite: Psyc 1001.

2119 Basic Nutrition (3)

The six classes of nutrients, their chemical basis, their physiological functions, and their conversion into usable energy. Nutrient needs across the lifespan. Prerequisite: BiSc 1005 or 1112 or Chem 1005 or 1111.

2121 Orthopaedic Taping and Bracing (1)

Laboratory complement to ExSc 2110; required for athletic training majors.

Laboratory fee.

3101 Independent Study (3)

For departmental majors only. Prerequisite: outline of intended project must be approved prior to registration by instructor and dean's office.

3102 Applied Sport Psychology (3)

Current research, theoretical perspectives, and practical aspects. The nature of peak mental performance and a range of psychological skills. Practical methods of applying mental skills training and assessing psychological skills in sports settings. Approaches to applying and developing mental skills programs for athletes. Professional and ethical issues.

Prerequisite: ExSc 2117.

3110 Internship (1 to 9)

For departmental majors. Admission by permission of advisor. Prerequisite: ExSc 2112.

3117 Injury Assessment (4)

Information and practical experience in the evaluation and assessment of orthopedic and other injuries. Prerequisite: ExSc 2110. Laboratory fee.

3118 Therapeutic Modalities in Sports Medicine (4)

Explanation and demonstration of the use of therapeutic modalities on the healing process, including discussion of the use of therapeutic modalities to enhance the rehabilitation process after athletic injury. Prerequisite: ExSc 3117 or permission of instructor. Laboratory fee.

3119 Therapeutic Exercise in Sports Medicine (4)

Discussion and application of general rehabilitation techniques to specific athletic injuries, including evaluation, implementation, and follow-up after specific joint injuries.

Prerequisite: ExSc 3117 or permission of instructor.

4110 Current Issues in Exercise Science (3)

Study of current literature with implications for exercise science specializations; use of library resources and retrieval systems; evaluation of professional competencies. For senior exercise science and athletic training majors only.

HEALTH AND WELLNESS

1101 Special Topics (1 to 3)

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

1102 Stress Management (3)

A holistic view of stress management, including mind, body, spirit, and emotions. The dominant stressors and how they affect health and wellness.

1103 Issues in Men's Health (3)

Issues in men's health ranging from the physical and emotional to the spiritual and occupational.

1104 Outdoor and Environmental Education (3)

A conceptual and experiential introduction to outdoor education, environmental education, wilderness travel, and outdoor leadership.

1105 Yoga and the Meaning of Life (3)

The historical teachings that have contributed to the physical, psychological, and spiritual practices of yoga.

1106 Drug Awareness (3)

Analysis of the complex role that drugs play in contemporary society and the ethical, legal, socioeconomic, and health issues that surround their therapeutic and recreational use.

1108 Weight and Society (3)

Background and concepts of body dissatisfaction, disordered eating, food preoccupation, and exercise obsession.

1109 Human Sexuality (3)

Biological and developmental aspects of human sexuality; psychological and emotional aspects of sexual behavior; sexual identity; social forces affecting sexual issues; and research trends in the area of human sexuality.

1110 Issues in Alternative Medicine (3)

Various modalities of alternative/complementary/integrative therapy. Critical analysis and evaluation of the many dimensions of these approaches.

1111 Sport and the Law (3)

Basic principles of the law as it applies to amateur and professional sports. Legal issues and their ramifications.

1112 Issues in Women's Health (3)

An introduction to health promotion and disease prevention pertaining especially to diseases, disorders, and conditions that are more prevalent among or unique to women or for which risk factors or interventions may differ for women and men. Topics are covered from epidemiological, sociocultural, historical, and behavioral perspectives.

1114 Personal Health and Wellness (3)

A survey of the various components involved in personal health and wellness, such as personal fitness, sexuality, mental health, and environmental health. Emphasis is on application of knowledge through the use of decision-making and behavior modification skills.

1116 Lifestyle Nutrition (3)

An introduction to nutrition that enables the student to make healthful food choices to enhance quality of life and prevention of chronic disease. Topics may include label reading, vegetarian diets, eating for exercise, and interpreting nutrient recommendations.

1117 Functional Fitness (3)

Core elements of personal fitness as applied to daily life. Emphasis on the development of functional fitness skills that can be practiced both in and out of the classroom.

LIFESTYLE, SPORT, AND PHYSICAL ACTIVITY

Credit for these courses is not recognized for any degree or certificate offered by GW. The University is not responsible for injuries received in any of the activities of these courses, and the student assumes full responsibility therefor.

1011 Hiking (1)

1012 Dance Conditioning (1)

1014 Meditation (1)

1015 Japanese Swordsmanship (1)

1020 Beginning/Intermediate Golf (1)

Course fee.

1021 Foil Fencing (1)

- 1022 **Basketball** (1)
- 1024 **Volleyball** (1)
- 1026 **Karate** (1)
- 1027 **Tennis** (1)
- 1028 **Massage** (1)
- Course fee.
- 1029 **Yoga** (1)
- 1030 **Fitness—Selected Activities** (1)
- 1031 **Weight Training** (1)
- 1032 **Aqua Aerobics** (1)
- 1033 **Swimming** (1)
- 1035 **Rock Climbing** (1)
- 1037 **Indoor Soccer** (1)
- 1038 **Racquetball** (1)
- 1039 **Cardio-Kick-Boxing** (1)
- 1040 **Self-Defense and Personal Safety** (1)
- 1041 **Mat Pilates** (1)
- 1042 **Cardio-Conditioning** (1)
- 1043 **Tai Chi** (1)
- 1044 **Aikido** (1)
- 1045 **Experimental Activities** (1)
- Topic and laboratory fee (if charged) announced in Schedule of Classes.
- 1046 **Taekwondo** (1)

1048 **Horseback Riding (1)**

Course fee.

1049 **Boxing (1)**

1053 **Squash (1)**

Equipment fee.

1056 **Scuba Diving Certification Course (2)**

This is an entry-level PADI (Professional Association of Diving Instructors) course, leading to international diver certification. Course fee.

1062 **Conditioning/Weight Training (2)**

1065 **Introduction to Therapeutic Massage (2)**

Course fee.

1066 **Sports Massage (2)**

Course fee.

1067 **Group Fitness Instructor Training (2)**

1068 **Sport Clinics and Workshops (1 to 3)**

There may be a laboratory fee, amount announced in Schedule of Classes.

1071 **Anatomy for Teachers of Yoga (1)**

Functional anatomy as applied to yoga: muscles and how they move in yoga poses; bones and how they function; the physiology of stretching; the dynamics of breathing; the stress reaction; and anatomy and physiology as they apply to the yogic “energy” body.

1072 **Methodology for Teachers of Yoga (1)**

Principles of demonstration, observation, and instruction of postures/asanas. Different teaching and learning styles, appropriate assisting/correcting of students, and qualities of a yoga teacher.

1073 Yoga Technique I (1)

Teaching basic standing and seated Hatha yoga.

1074 Yoga Technique II (1)

Teaching basic backward- and forward-bending Hatha yoga postures/asanas.

1075 Yoga Technique III (1)

Teaching basic inversion and twisting Hatha yoga postures/asanas.

1076 Yoga Teacher Practicum (1)

A culminating course to help students further develop teaching skills through assisting with instruction of classes taught by a RYA instructor.

FILM STUDIES

Committee on Film Studies

H. Feigenbaum (*Chair*), Y. Captain, R. Guenther, K. Harvey, A. Hildebeitel, P. Rollberg, N. Seavey

Minor in film studies—Students in Columbian College of Arts and Sciences may earn a minor in film studies by completing Film 2151, 2152, and 2153–54 plus three additional film courses chosen from AmSt/AH 1070, Clas 3103, Arab 3502, Film 2155, 2156, Fren 3560, 3700, Ger 3181, 3187, Ital 4183, Japn 3162, Kor 3162, Phil 1062, Slav 2785, 2786, Span 3560, 3700.

2151 Film Theory (3)

A reading-intensive immersion in classical film aesthetics and a survey of the theoretical and critical canon of cinema literature. Laboratory fee.

(Fall)

2152 Genres of Film (3)

An exploration of the relationship between cinematic structure and narrative content in various types of film. Laboratory fee. (Spring)

2153–54 History of World Cinema I–II (3–3)

A two-semester sequence covering 100 years of international cinematic history from an aesthetic and political point of view. Laboratory fee.

(Academic year)

2155 Screenwriting (3)

Introduction to the art and craft of screenwriting—concept, genre, character, structure, dialogue, scene/sequence construction, and, ultimately, the preparation of scripts and treatments for a variety of screen formats.

2156 Advanced Screenwriting (3)

Advanced phases of screenwriting culminating in the preparation of a full-length screenplay, with contextual study of contemporary, international, and classical films toward a fuller appreciation of movies as a cultural whole.

FINANCE

Professors T.M. Barnhill, W. Handorf, M.S. Klock, I.G. Bajeux-Besnainou, G.M. Jabbour,

R. Van Order (*Chair*)

Associate Professors N.G. Cohen, P.S. Peyser, A.J. Wilson, R. Savickas, S. Agca, G.

Jostova, A. Baptista, M. Hwang

Assistant Professors C.A. Pirinsky, B.J. Henderson, O. Altinkilic

Professorial Lecturers S. Uyanik, R. Strand

See the School of Business for programs of study leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration.

Departmental prerequisite: BAdm 3501 is prerequisite to all courses in the Finance Department.

3001 **Intermediate Finance (3)** Wilson

Theory and practice of acquiring and using funds. Simulations of business decisions by cases and/or models to assess the risk/return interaction of investment, financing, and dividend decisions. (Fall and spring)

3101 **Investment and Portfolio Management (3)** Baptista, Henderson

Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk–reward and computer-aided analysis. (Fall and spring)

3201 **Exploring Finance with a Financial Simulation (3)** Wilson

Corporate financial analysis as explored through the FINGAME financial simulation software. Focus on intertemporal decision making for capital budgeting and financing of a simulated firm.

3301 **Money and Capital Markets (3)** Hwang, Klock, Van Order

The process of capital formation in a free enterprise economy, with special emphasis on factors affecting the level and structure of interest rates. Money market, capital market, and derivative contracts (futures and swaps) are evaluated from both investment and financing perspectives.

(Fall and spring)

4001 **Advanced Financial Management** (3) Barnhill, Cohen, Altinkilic, Savickas

Analysis and readings covering applications of theory to financial management. Case studies for decision making involving working capital, capital budgeting, financing, dividend policy, and valuation. Prerequisite or concurrent registration: Fina 3301 or 3001. (Fall and spring)

4101 **Applied Financial Securities Analysis** (3) Jabbour

Practical security analysis techniques and investing approaches employed by professional investment managers. Prerequisite: BAdm 3501.

(Fall and spring)

4201 **Real Estate Investment** (3) Hwang

Principles of real estate investment, including valuation, appraisal, financing, and development, in addition to a discussion of the mortgage market and its institutions. (Fall)

4900 **Special Topics** (3) Staff

Experimental offering; new course topics and teaching methods.

4995 **Independent Study** (arr.)

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

FINE ARTS AND ART HISTORY

Professors L.F. Robinson, J.F. Wright, Jr., T. Ozdogan, B. von Barghahn, D. Bjelajac

Associate Professors P. Jacks, D. Kessmann (*Chair*), S.A. Rigg

Assistant Professors A.B. Dumbadze, B.K. Obler, J. Brown, J.G.H. Sham

Bachelor of Arts with a major in art history—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in related areas—Fren 1004, Ger 1004, Ital 1004, or Span 1004.
3. Required courses in the major—33 credit hours consisting of 6 credits each in ancient–medieval, Renaissance–Baroque, and modern European–American art history; 6 credits of art history seminars; and an additional 6 credits of upper-division courses in art history or, with approval of the advisor, in related departments; 3 credits of any fine arts course.

Bachelor of Arts with a major in fine arts—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Requirements include 9 credit hours of art history courses and 30 credits of fine arts courses; up to 21 additional credits in the department may count toward the degree.

Bachelor of Arts with a combined major in art history and fine arts—The following requirements must be fulfilled in consultation with the departmental advisor:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. A total of 54 credit hours in the department: 27 in art history and 27 in fine arts. The art history courses must include AH 1031–32 and one course in each of the following areas—ancient–medieval, Renaissance–Baroque, and modern European–American; one seminar; three additional upper-division art history electives.

Combined Bachelor of Arts/Master of Arts in the field of art history—Interested students should consult the departmental art history advisor early in the junior year.

Combined Bachelor of Arts with a major in fine arts/Master of Arts in the field of art therapy—Students interested in this dual degree program should consult the director of the Art Therapy Program early in the junior year.

Special Honors in fine arts and Special Honors in art history—For graduation with Special Honors, students must have attained, by the end of the junior year, a grade-point average of at least 3.5 in the major and 3.3 overall. By the end of the junior year, students should consult their advisor regarding eligibility and selection of an area of study and a director of the research or creative arts project.

Minor in art history—Required: AH 1031, 1032 and four upper-division art history courses for a total of 18 credits.

Minor in fine arts—Required: 18 credit hours of general course work in fine arts. Students should consult the undergraduate fine arts advisor.

Combined minor in art history and fine arts—Required: 9–12 credits of course work in art history and 9–12 credits in fine arts, for a total of 21 credits. A program of study is developed in consultation with the undergraduate advisors in art history and fine arts.

With permission, a limited number of fine arts graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

ART HISTORY

1031–32 **Survey of Western Art I (3–3)**

Staff

An introduction to the history of art through the study of major monuments, movements, and concepts. AH 1031: from the prehistoric period, through the Ancient

Mediterranean cultures, including Greece and Rome, to the end of the Middle Ages. AH
1032: from the early Renaissance through the Baroque and modern eras.

1070 **The American Cinema** (3) Staff

Same as AmSt 1070.

2071 **Introduction to the Arts in America** (3) Bjelajac

A survey of American art from the period of colonial exploration and settlement to the postmodern present. Political and social meanings of painting, sculpture, architecture, prints, and photographs. The relationship of art to religion and nationalism; issues of class, race, and gender. Same as AmSt 2071.

2145 **History of Decorative Arts: European Heritage** (3) Staff

Changing styles of European furniture, textiles, ceramics, and glass in the context of general trends in art history and changing patterns in economic, technological, social, and cultural history. From antiquity to the modern age.

2154–55 **American Architecture** (3–3) Longstreth

Same as AmSt 2520–21.

2160 **Latin American Art and Architecture** (3) von Barghahn and Staff

Specific topic to be announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

2161 **History of Decorative Arts: American Heritage** (3) Staff

The decorative arts in America from the 17th century to the modern period.
Consideration of changing visual characteristics in relation to the changing American experience.

2162 **History of Photography** (3) Obler

The historical, social, aesthetic and technological developments of the photographic medium, including its relationship to modern art and modes of visual representation and the properties that inform our understanding of photographic meaning.

2165 **Modernist and Postmodernist Art and Theory (3)** Dumbadze, Obler

Artists, art forms, and critical concepts from the 1960s to the present, focusing on modernist theory and the development of postmodernist art and thought. Prerequisite: AH 2143 or 2153.

2190 **East Asian Art (3)** Staff

Survey of the arts of China, Japan, and Korea.

2191 **South Asian Art (3)** Staff

Survey of the arts of India, Pakistan, Sri Lanka, Nepal, and Tibet, from prehistoric times to circa 18th century.

2192 **The Art of Southeast Asia (3)** Staff

The arts of Southeast Asia—Vietnam, Laos, Cambodia, Myanmar (former Burma), Thailand, and Indonesia, especially Java and Bali. The fusion of Indian and Chinese concepts with indigenous cultural traits.

3101 **Ancient Art of the Bronze Age and Greece (3)** Staff

A survey of Greek art from the Minoans and Mycenaeans (c. 2000 B.C.) to the age of Alexander (c. 300 B.C.). Relationships among the arts of the different groups in the Aegean area and their impact on Western culture. The Theran volcanic eruption, the “Dorian Invasion,” the portrayal of women, “heroic nudity,” and the assumption of a stylistic chronology.

3102 **Ancient Art of the Roman Empire (3)** Staff

A survey of Roman art from the successors of Alexander the Great (c. 300 B.C.) to the fall of the Roman Empire in the West (c. 300 A.D.). The impact of the Greek world on Roman art and culture; innovations and achievements of the Romans in architecture, portraiture, and historical narrative. Focus on the city of Rome and other areas of the Roman world such as North Africa and Asia.

3103 **Art and Archaeology of Egypt and the Near East (3)** Staff

The great artistic tradition of the Nile Valley and the contemporary civilizations (c. 3000 B.C. to after 1000 B.C.) between the rivers Tigris and Euphrates (present day Iraq). The Pyramid Age, the temples at Karnak and Luxor, the tombs of the Valley of the Kings, and the artistic traditions of the Sumerians, Akkadians, Babylonians, Assyrians, and Persians.

3104 **Art and Archaeology of the Aegean Bronze Age (3)** Cline

Excavational and multidisciplinary aspects of classical archaeology. Minoan and Mycenaean civilizations (1700–1200 B.C.). Same as Anth 3806.

3105 **Topics in Ancient Art and Archaeology (3)** Staff

Same as Clas 3115.

3106 **Art and Archaeology of Israel and Neighboring Lands (3)** Cline

Same as Anth 3805.

3109 Seminar in Ancient Art and Architecture (3) Staff

For majors in art history; non-majors must have permission of instructor. May be repeated for credit provided the topic differs.

3111	Early Christian and Byzantine Art and Architecture (3)	Staff
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Francis I and Fontainebleau Palace, Henry VIII and Hampton Court, Johann Friedrich of Saxony, and the Holy Roman Emperors Maximilian I and Charles V. François Clouet, Hans Holbein, Lucas Cranach, Albrecht Dürer, Pieter Brueghel, Bernard van Orley, and others. Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

3131 **Italian Art and Architecture of the 17th Century (3)** Jacks

The Counter-Reformation and creation of the Baroque in painting, sculpture, and architecture in Rome (Carracci, Caravaggio, Bernini, Borromini, Pietro da Cortona), Turin (Guarini, Juvarra), and Venice (Longhena).

3132 **Topics in Northern European Art** von Barghahn

and Architecture of the 17th Century (3)

Hapsburg Flanders and Brussels under the Spanish archdukes and their patronage of Rubens and his circle. The role of Dutch merchants commissioning secular themes in Utrecht, Haarlem, Delft, Leyden, and Amsterdam from Golden Age artists such as Rembrandt, Vermeer, and Hals.

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

3134	Topics in Spanish and Portuguese Art	von Barghahn
	through the 16th Century (3)	

The Kingdoms of the Iberian Peninsula from the Reconquest of Granada to the Renaissance Age of Exploration. Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

3135 **Topics in 17th/18th Century Spanish** von Barghahn

and Portuguese Art (3)

Secular and sacred art of the Baroque Golden Century or the Rococo

Enlightenment. Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

3140 European Art of the 18th Century (3) Bjelajac

Painting, sculpture, and architecture in France, Great Britain, and Italy. Emphasis on Watteau, Chardin, David, Hogarth, Gainsborough, Reynolds, Canaletto, and Tiepolo.

3141 European Art of the Early 19th Century (3) Robinson

Neoclassicism and Romanticism in the context of Western European political, social, and cultural developments. Emphasis on France, England, and Germany and the representative styles of David, Ingres, Delacroix, Turner, Constable, and Friedrich.

3142 European Art of the Late 19th Century (3) Robinson

The revolution in style of Realism, Impressionism, and Post-Impressionism in the context of Western European political, social, and cultural developments. Emphasis on representative styles of Courbet, Manet, Monet, Morisot, Repin, Seurat, Cezanne, Van Gogh, and Gauguin.

3143 European Art of the Early 20th Century (3) Obler

20th-century European painting, sculpture, and architecture, from their origins in the late 19th century through Surrealism. Emphasis on theory. The work of artists such as Matisse, Picasso, Kandinsky, Duchamp, and Mondrian. Prerequisite: AH 1032 or 2142.

3146 Modern Architecture in Europe and America (3) Jacks

Major developments in architecture and urbanism from the Industrial Revolution to the end of the 20th century.

3151 American Art in the Age of Revolution (3)

Bjelajac

American art during the 18th-century “consumer revolution,” the American War for Independence, and the early republic. Emphasis on the socioeconomic and political purposes of art, with focus on Enlightenment symbolism and the visualization of national identity. Prerequisite: AH 1032 or 1071. Same as AmSt 3151.

3152 American Art in the Era of National Expansion (3)

Bjelajac

American art from the opening of the Erie Canal in 1825 to the Spanish-American War in 1898. Emphasis on the role of art in the expansion of the United States, exploring issues of race, class, and gender; art and religion. Prerequisite: AH 1032 or 1071. Same as AmSt 3152.

3153 American Art of the 20th Century (3)

Dumbadze

20th-century American painting and sculpture from the turn of the century to the beginnings of postmodernism, with focus on the avant garde. Artists of the Stieglitz circle and later modernist movements such as Abstract Expressionism, Pop, Op, Minimal, and Conceptual art. Theory and criticism. Prerequisite: AH 2142 or 2143.

3156 Folk Arts in America (3)

Vlach

Same as AmSt 2530.

4119 Seminar in Medieval Art and Architecture (3)

Staff

For majors in art history; non-majors must have permission of instructor. May be repeated for credit provided the topic differs.

4129 Seminar in Renaissance Art and Architecture (3)

Jacks, von Barghahn

For majors in art history; non-majors must have permission of instructor. May be repeated for credit provided the topic differs.

4139	Seminar in Baroque Art and Architecture (3)	Jacks, von Barghahn
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For majors in art history; non-majors must have permission of instructor. May be repeated for credit provided the topic differs.

4149	Seminar in Modern European Art and Architecture (3)	Bjelajac, Robinson, Obler
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For majors in art history; non-majors must have permission of instructor. May be repeated for credit provided the topic differs.

4159 **Seminar in American Art and Architecture (3)** Bjelajac, Dumbadze

For majors in art history; non-majors must have permission of instructor. May be repeated for credit provided the topic differs.

4198	Independent Study (3)	Staff
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Directed research and study in a specific area of art history to be approved by a faculty member. May be repeated for credit.

4199	Internship (3)	Staff
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Open to candidates for the B.A. in art history only and with the approval of advisor in art history. May not be repeated for credit toward the degree. May be taken *P/NP* only.

FINE ARTS

Note: Upper-division fine arts courses may be repeated for credit with approval of the undergraduate fine arts advisor or the department chair. A course fee is charged for all fine arts courses listed here except FA 1075, 4195, and 4199.

1011-12	Design (3-3)	Staff
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Fundamental studies of principles and elements of design. FA 1011: two-dimensional design. FA 1012: three-dimensional design.

1014 Handbuilt Ceramics (3)

Ozdogan and Staff

Working with clay as an art form. Pinch, coil, slab, hump and press mold, paddling, and hollowing techniques. Sketch studies, clay and glaze making, reduction and oxidation kiln firings.

1015 Wheelthrown Ceramics (3)

Ozdogan and Staff

Development of cylindrical and open forms. Sketch studies, trimming, clay and glaze making, reduction and oxidation kiln firings.

1017–18 Sculpture I–II (3–3)

Sham and Staff

Beginning study of design and fabrication of sculpture. Basic sculptural techniques for various media, including clay, plaster, stone, and wood.

1021–22 Drawing I–II (3–3)

Wright and Staff

Development of a fundamental understanding of line, shape, value, contrast, composition, and mark making. Emphasis on working directly from life, along with a variety of conceptual issues. Consideration of traditional and contemporary strategies and skills toward development of technique, process, and meaning. FA 1021 is prerequisite to FA 1022.

1026 Painting: Visual Thinking (3)

Brown and Staff

Development of technical and perceptual skills that are the foundation of visual expression. Beginning projects start with a simple introduction to the mechanics of paint handling: how to begin a painting, apply paint, and model form. Value, line, color, and abstraction.

1027 **Painting: Structure and Color (3)**

Brown and Staff

Work based on a variety of approaches. Focus on how images become vital through the qualities inherent to the medium. Prerequisite: FA 1021 or 1026.

1028 **Painting: Watercolor (3)**

Staff

Working with basic issues of light, color, and paint quality, students learn a variety of techniques, including working transparently, wet-on-wet, wet-on-dry, lifting, masking, and drybrush. Exploration of the medium's inherent qualities as well as those it shares with other painting media.

1041 **Black-and-White Photography (3)**

Kessmann and Staff

Introduction to the materials and processes of black-and-white photography. Camera operations, film processing, printing, and presentation methods. Gaining technical skills. Issues concerned with the visual language of photography.

1042 **Color Photography (3)**

Kessmann and Staff

Introduction to the materials and processes of color photography. Color theory, exposure techniques, film scanning, digital color correcting, and printing. The use of color as a means of visual communication and creative expression.

1071 **New Media: Digital Art (3)**

Rigg, Stephanie, and Staff

A survey of the computer as a creative art tool. Topics covered include bit-mapped and vector graphics, digital sound and imaging, basic time-based media, and digital text, integrated with fundamental design principles of concept development, composition, color theory and presentation.

1075 **East Asian Calligraphy (3)**

Staff

Same as EALL 1075.

2125 **Ceramics: Wheelthrown Forms** (3) Ozdogan and Staff

Aesthetic and technical development of wheelthrown ceramic forms. Exploration of attachments: lids, spouts, handles, and footing devices. Sketches and technical drawings, clay and glaze-making tests, varied temperature firings in reduction and oxidation atmospheres. Prerequisite FA 1015.

2127 **Ceramic Design in Handbuilding** (3) Ozdogan and Staff

Handbuilding techniques of pinch, coil, slab, hump and press mold, paddling, and hollowing. Sketch studies, clay and glaze tests. Orientation to studio operations and maintenance.

2131 **Ceramic Sculpture** (3) Ozdogan and Staff

Developing an understanding of the sculptural ceramic form that integrates both quality and creativity. Techniques in hollow and solid construction. Varied temperature firings in reduction and oxidation atmospheres.

2139 **Special Topics: Ceramics** (3) Staff

Prerequisite: FA 1014 or 1015 or permission of instructor.

2140 **Sculpture III** (3) Staff

Advanced techniques in a variety of media. Prerequisite: FA 1017 or 1018.

2149 **Special Topics: Sculpture** (3) Staff

Prerequisite: FA 1017 or 1018 or permission of instructor.

2150 **Drawing III** (3) Wright and Staff

Advanced investigation of drawing as an organizing tool for thought, analysis, and personal imagery. Traditional and contemporary approaches to topics related to perceptual and conceptual concerns. Prerequisite: FA 1022.

2151 **Advanced Drawing Techniques (3)** Wright and Staff

Investigation of the common concerns and creative processes that have dissolved boundaries between drawing and painting in the late 20th century. Prerequisite: FA 2150.

2159 **Special Topics: Drawing (3)** Staff

Prerequisite: FA 1021 or 1022 or permission of instructor.

2160 **Figure Painting: Observation and Gesture (3)** Brown and Staff

Consideration of the process of vision as mediated through manipulation of paint to form an image. Development of solutions to clarity, articulation, energy, and finish. Prerequisite: FA 1026 or 1027.

2161 **Problems in Color (3)** Staff

Exploration of the objective rationale and subjective experience of color through the execution of problems in color contrast and color scales. Prerequisite: FA 1026 or 1027.

2162 **Painting: Contemporary Issues (3)** Staff

Examples from contemporary art serve as starting points for discussion of the creative process. Postmodern strategies to rethink and challenge various hierarchies of subject, style and medium. Prerequisite: FA 1026 or 1027.

2169 **Special Topics: Painting (3)** Staff

Prerequisite: FA 1026 or 1027 or permission of instructor.

2170 **Advanced Photography:** Kessmann and Staff

Exposure and Printing Techniques (3)

Pre-visualization, accurate exposure and development, and the craft of black-and-white printmaking. Techniques and strategies for creation of a portfolio that is aesthetically and conceptually engaging. Prerequisite: FA 1041.

2171 **Advanced Photography: Digital Color Printing (3)** Kessmann and Staff

Further development of color theory and the technical skills to make high-quality inkjet prints. Critiques and discussion of contemporary artistic practice. Prerequisite: FA 1042.

2172 **Photography: Contemporary Issues (3)** Kessmann and Staff

Emphasis on the incorporation of contemporary strategies, trends, and approaches into the student's personal practice. The work of contemporary artists who use photography will inform the work produced. Prerequisite: FA 1041 or 1042.

2179 **Special Topics: Photography (3)** Staff

Prerequisite: FA 1041 or 1042 or permission of instructor.

2180 **New Media: Digital Illustration (3)** Rigg and Staff

Advanced investigation of two- and three-dimensional drawing and illustration techniques. Print and/or digital portfolio preparation. Prerequisite: FA 1071 or permission of instructor.

2181 **New Media: Digital Imaging (3)** Rigg and Staff

Advanced examination of bit-mapped imaging techniques. Methods of electronic dissemination of visual information. Prerequisite: FA 1071 or permission of instructor.

2182 **New Media: Time-based Visual Expression (3)** Rigg and Staff

Contemporary two-dimensional animation, video, and multimedia systems and applications, including individual portfolio projects. Prerequisite: FA 1071 or permission of instructor.

2183 **New Media: Digital Printmaking (3)** Rigg and Staff

An exploration of digital printmaking techniques, including color profiling.

Prerequisite: FA 1071 or permission of instructor.

2184 **New Media: Mixed Media** (3) Rigg and Staff

Combining digital visualization with traditional mediums, artist bookmaking, collage, assemblage, etc. Prerequisite: FA 1071 or permission of instructor.

2189 **Special Topics: New Media** (3) Staff

Prerequisite: FA 1071 or permission of instructor.

2193 **Professional Practices** (3) Staff

A wide overview of the contemporary art world, including how artists promote their work to galleries, public art organizations, and museums; writing successful grant proposals, artist statements, essays, and reviews; and comparing the quality of venues for art and art journalism.

4195 **Critical Practices** (3) Staff

This structured independent study consists of weekly group critiques that bring together students working in a variety of media. Discussions, which range from practical to aesthetic issues, challenge students to focus and articulate their visual knowledge.

Prerequisite: permission of instructor.

4199 **Internship** (3) Staff

Open only to candidates for the B.A. in fine arts with approval of the advisor in fine arts. May not be repeated for credit toward the degree. May be taken

P/NP only.

FORENSIC SCIENCES

The Department of Forensic Sciences offers graduate degree programs through Columbian College of Arts and Sciences. The following courses are available to undergraduates.

2103–4 **Introduction to Forensic Sciences (3–3)** Staff

Topics in the application of science to the criminal justice system, including personal identification, analysis of drugs, forms of trace evidence, identification of biological fluids, forensic pathology, and forensic toxicology. Prerequisite: two semesters of a laboratory science other than astronomy and permission of instructor.

2190 **Topics in Forensic Sciences (3)** Staff

Prerequisite: Any combination of two courses from BiSc 1005–6 or Chem 1003–4 or equivalent and junior standing.

FRENCH

See **Romance, German, and Slavic Languages and Literatures.**

GEOGRAPHY

Professor M.D. Price

Associate Professors E. Chacko (*Chair*), L.M. Benton-Short, D. Rain, R. Engstrom

Assistant Professors M. Atia, M. Keeley, N. Shiklomanov, M. Mann

Teaching Assistant Professor J.P. Dymond

Professorial Lecturers L. Marcus, I. Cheung, J. Cromartie, W. Reisser

Lecturer N. Cowan

Bachelor of Arts with a major in geography—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Required courses in the major—36 credit hours, including Geog 1001, 1002, 4195.

A minimum of two courses must be chosen from each of the following groups: Group A (Physical/Environmental/Resources)—Geog 1003, 2108, 2110, 2128, 3132, 2134, 2136, 2137, 3143; Group B (Human)—Geog 2124, 2125, 2127, 2133, 2140, 2141, 3143, 2144, 2145, 2146, 2147, 2148, 3810; Group C (Techniques)—Geog 2104, 2105, 3106, 2107, 4121, 2196. At least one course must be chosen from Group D (Regional)—Geog 2120, 3154, 3161, 3164, 3165.

Special Honors—To graduate with Special Honors, the student must meet the general requirements stated under University Regulations and have a minimum grade-point average of 3.75 in geography courses and 3.5 overall.

Minor in geography—Required: Geog 1001, 1002, and one course from each of the groups listed under requirements for the major.

Minor in geographic information systems—Required: Geog 2104, 2105, 2107, 3106, 4121, and an additional course selected in consultation with a departmental advisor.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

1001 **Introduction to Human Geography (3)** Benton-Short, Chacko, Atia,
Dymond

A systematic survey of human geography; spatial perspectives on demographic, social, cultural, economic, and political changes around the world. (Fall and spring)

1002 **Introduction to Physical Geography (4)** Engstrom, Shiklomanov

A systematic survey of environmental geography; perspectives on environments and human ecology, including ecosystems and their use, and resource geography. Laboratory fee. (Fall and spring)

1003 **Society and Environment (3)** Rain, Keeley

An introduction to the dynamic relationship between society and the physical environment, with focus on population, natural resources, environmental degradation, pollution, and conservation.

2104 **Introduction to Cartography and GIS (3)** Staff

Fundamentals of cartography; geographic data structure and information systems. Laboratory fee.

2105 **Techniques of Spatial Analysis (3)** Staff

Nature of geographical inquiry and analytical methods used in the study of spatial processes and patterns. Laboratory fee.

2107 **Introduction to Remote Sensing (3)** Engstrom

Remote-sensing techniques using digital satellite imagery and aerial photography. Application to rural and urban settings, vegetation, and environmental monitoring. Laboratory fee. Prerequisite: Geog 2105 or permission of instructor.

2108 **Weather and Climate (3)** Shiklomanov

The elements and controls of weather and climate. Topics include energy and water balances, atmospheric general circulation, and severe weather events. Prerequisite: Geog 1002.

2110 **Climate and Human Ecology (3)** Staff

Interrelationships between human activities and the climatic environment. Emphasis on global climatic change. Prerequisite: Geog 1002.

2124 **Urban Transportation (3)** Marcus

The relationship between freight and passenger transportation systems and urban land use patterns and structure. Prerequisite: Geog 1001.

2125 **Transportation and Communication (3)** Marcus

The structure and evolution of transportation and communication networks and their impact on regional development. Prerequisite: Geog 1001.

2127 **Population Geography (3)** Chacko, Cromartie

Patterns of world population; factors contributing to population pressures, growth, and migrations.

2128 **Geomorphology (3)** Shiklomanov

Understanding the nature, origin, and development of landforms in the field and through the use of maps and aerial photos. Prerequisite: Geog 1002.

2133 **People, Land, and Food (3)** Rain

Domestication and dispersal of plants and animals; development of agricultural systems; spatial disparities in world food production, demand, and distribution.

2134 **Energy Resources (3)** Staff

Analysis of regional patterns and trends in consumption and production of energy resources. Examination of international energy linkages and energy policies of selected nations. Prerequisite: Geog 1002.

2136 **Water Resources (3)** Engstrom

Analysis of the global spatial patterns, development, use, and quality of water resources. Prerequisite: Geog 1002.

2137 **Environmental Hazards (3)** Staff

Examination of environmental hazards with emphasis on the use of geographic information systems. Prerequisite: Geog 1002.

2140 **Cities and Society (3)** Benton-Short

The design and function of cities in the United States; contemporary, economic, political, and social change. Prerequisite: Geog 1001.

2141 **Cities in the Developing World (3)** Rain

Urbanization processes, problems, and management in the developing world. Focus on urban location, politics, housing, services, employment, and environmental issues.

Prerequisite: Geog 1001.

2144 **Explorations in Historical Geography (3)** Staff

Same as AmSt 2144.

2145 **Cultural Geography (3)** Dymond

The distribution and dynamics of cultural patterns around the world; analysis of culture as a process.

2146 **Political Geography (3)** Dymond

Interrelationships among the human and physical environment and political systems; the organization of political territories.

2147 **Military Geography (3)** Staff

An examination of environmental and locational factors and their impact on military planning and operations.

2148 Economic Geography (3)

Atia, Mann

Locational influences on and spatial variation of the development of manufacturing, services, trade, and finance. Prerequisite: Geog 1001.

2196 Field Methods in Geography (3)

Engstrom, Keeley

For geography and environmental studies majors in their junior or senior year. Field research in human and physical geography. Students participate in several field exercises and develop their skills of observation, field mapping, repeat photography, and surveys. Laboratory fee.

3106 Intermediate Geographic Information Systems (3)

Engstrom, Mann

Principles of geographic information systems and their use in spatial analysis and information management. Laboratory fee. Prerequisite: Geog 2104 and 2105.

3120 World Regional Geography (3)

Price, Dymond

World cultural regions and the impacts of globalization; the environmental human conditions that undergird current problems and future prospects.

3132 Environmental Quality and Management (3)

Keeley

The evolution of environmental management philosophies and tools. The global distribution, utilization, and degradation of natural resources. Prerequisite: Geog 1002.

3143 Urban Sustainability (3)

Benton-Short, Keeley

Relationship between urban spaces and the environment through the lens of sustainability. Prerequisite: Geog 1001.

3154 Geography of the Middle East and North Africa (3)

Atia

Cultural and physical regional patterns of the Middle East and North Africa. Prerequisite: Geog 1001 or 1002.

- 3161 **Geography of Latin America** (3) Price, Dymond
Examination of spatial characteristics of physical and cultural phenomena in Latin America.
- 3164 **Geography of Africa** (3) Rain
Cultural and physical patterns of Africa. Prerequisite: Geog 1001 or 1002.
- 3165 **Geography of South Asia** (3) Chacko
An examination of the complex interplay of environmental, economic, sociocultural, and political factors in South Asia and their effects at the local and regional levels.
- 3189–90 **Readings in Geography** (arr.) Staff
Prerequisite: 12 credit hours of geography and permission of instructor.
- 3198 **Special Topics** (3) Staff
Consideration of geographic aspects of topical and future problems of society. May be repeated for credit provided that the topic differs. Prerequisite: Geog 1001 or 1002.
- 3810 **Building Cities** (3) Benton-Short
An examination of historical and contemporary trends and dynamics in urban planning in the United States and abroad. Prerequisite: Geog 1001. Same as AmSt 3810.
- 4121 **Advanced Geographic Information Systems** (3) Staff
Integration of GIS, remote sensing, and spatial modeling. Laboratory fee. Prerequisite: Geog 2107 and 3106.
- 4195 **Proseminar in Geographic Thought** (3) Price, Dymond
For students completing the major in geography. Development of geographic thought, theories, and methodologies; geographic curricula. Prerequisite: permission of the advisor.
- 4199 **Internship** (1 to 3) Staff

Fieldwork, internship, or other controlled assignment with an agency or organization engaged in work in applied geography. Prerequisite: 12 credit hours of geography courses and permission of instructor. May be repeated for credit to a maximum of 6 credits.

GEOLOGICAL SCIENCES

Committee on Geological Sciences

H. Teng, R.P. Tollo, J.M. Clark, C.A. Forster, C.E. Brown, G. Mattiotti, E. Pauli

Bachelor of Arts with a major in geological sciences—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Geol 1001 and 1002, or 1002 and 1005.
3. Required courses in related areas—Chem 1111–12.
4. Required courses for the major—Geol 2111, 2112, 2122, 3126, and 4195, plus three courses chosen with approval of the program advisor from a list of designated courses.

Bachelor of Science with a major in geological sciences—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Geol 1001 and 1002, or 1002 and 1005.
3. Required courses in related areas—Chem 1111–12; Phys 1011–12 or Astr 1001–2; Math 1220–21 or 1231 or Stat 1091. Students who wish to focus their study on geobiology must include BiSc 1111–12 in their program.
4. Required courses for the major—Geol 2111, 2112, 2122, 3126, and 4195, plus four courses chosen with approval of the program advisor from a list of designated courses.

Special Honors—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors must maintain a grade-point average of 3.3 both cumulative overall and for courses in the major and must submit an approved Honors thesis.

Minor in geological sciences—Prerequisite: Geol 1001 and 1002, or 1002 and 1005. The minor consists of Geol 2111, 2112, 2122, 3126, and 4195.

1001 **Physical Geology** (3) Tollo, Brown

Lecture, laboratory. An introduction to the principal features of the composition and structure of the earth. Topics include the nature of minerals and rocks, surface and deep earth processes, mineral and energy resources, and plate tectonics. Laboratory fee. Credit will not be given for both Geol 1001 and 1005. (Fall and spring)

1002 **Historical Geology** (3) Forster, Brown

Lecture, laboratory. An introduction to the history of the earth. Topics include sedimentary environments, plate tectonics, origin of life, and evolution. Laboratory fee. Prerequisite: Geol 1001 or 1005.

(Fall and spring)

1005 **Environmental Geology** (3) Teng, Brown

Lecture, laboratory. An introduction to the impact of geology on the environment, with emphasis on the relation of people and society to natural environments; population evolution, natural hazards, and mineral resources. Laboratory fee. Credit will not be given for both Geol 1001 and 1005.

(Fall and spring)

1006 **Science and the Environment** (3) Staff

The large-scale processes operating within the atmosphere, oceans, and solid Earth.

Prerequisite: Geol 1001 or 1005. (Spring)

2105 **Geological Hazards in Land-Use Planning** (3) Staff

Lecture and laboratory. An analysis of geological hazards and related factors that affect land-use planning. Field trip. Prerequisite: Geol 1001 or 1005 or permission of instructor. Laboratory fee. (Spring)

2106 **Oceanography** (3) Brown

The ocean with its many environments represents the last largely unexplored frontier on earth. Origin of the ocean systems and plate tectonics, ocean habitats and their biota, marine hydrology and ocean currents; air–sea interaction and climate control; ocean mapping techniques; environmental regulations covering marine resources. Laboratory fee. Prerequisite: Geol 1001 or 1005.

2111 **Mineralogy** (4) Tollo

Lecture and laboratory. Introduction to the crystallography and chemical systematics of rock-forming and ore minerals. Exercises emphasize the analysis of mineralogic data and the paragenesis of mineral assemblages. Prerequisite: Geol 1001 or 1005 or permission of instructor. Laboratory fee. (Fall)

2112 **Igneous and Metamorphic Petrology** (4) Tollo

Lecture and laboratory. Introduction to basic light theory and the identification and characterization of minerals through optical properties. Laboratory exercises provide an introduction to petrologic analysis of igneous and metamorphic mineral systems.

Prerequisite: Geol 2111 or permission of the instructor. Laboratory fee. (Spring)

2122 **Structural Geology** (3) Staff

Lecture and laboratory. Study of natural and experimental rock deformation and the relationships between stress and strain as recorded by geologic structures. Prerequisite: Geol 1001 or 1005. Laboratory fee. (Fall)

2151 **History of Life** (3) Forster

A review of the origin of life, the geologic record, and the evolutionary history of the major groups of organisms, including the origin of life and evolution of invertebrates, vertebrates, and plants. Prerequisite: Geol 1001 or 1002 or BiSc 1111–12. Laboratory fee. Same as BiSc 2451. (Spring)

2159 **Geobotanical Ecology of the Central Appalachians** (4) Tollo, Wells

A multidisciplinary approach to Appalachian ecology involving application of scientific principles from both geology and botany, stressing interrelationships between geological, geochemical, and biological processes. Field trips. Laboratory fee. Prerequisite: Geol 1001 or 1005 and BiSc 1111–12; or equivalent with permission of instructor.

(Spring, odd years)

2190 **Special Topics** (1 to 3) Staff

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

3118 **Volcanology** (3) Tollo

Fundamental principles and geologic processes associated with volcanism. Eruptive styles, processes leading to magma production and transport, triggering mechanisms, plate tectonic settings, volcanic hazards, and disaster mitigation. Case histories of selected volcanic eruptions examined in detail. Prerequisite: Geol 2111 or permission of instructor. Laboratory fee.

(Spring)

3119 Field Experience in Volcanology (1)

Tollo

Week-long field exercise at a major volcanic center in the western United States.

Field-based interpretation and analysis of volcanic and related rocks. The geology of each site and the processes responsible for volcanism discussed in detail. Corequisite: Geol 3118.

Deposit for expenses is required.

3123 Crustal Dynamics (3)

Staff

Basic plate tectonic processes and features; the plate tectonic paradigm in historical evolutionary framework. Students present an original research project orally and in writing.

Prerequisite: Geol 2122. Laboratory fee.

3126 Sedimentology and Stratigraphy (4)

Forster

Lecture and laboratory. Introduction to sedimentation and stratigraphy; origin and classification of sediments and sedimentary rocks; introduction to clastic and carbonate depositional environments and stratigraphic principles. Prerequisite: Geol 1002, 2111.

Laboratory fee. (Fall)

3131 Global Climate Change (3)

Brown

Fundamental causes and patterns of climate change. Methods of reconstruction of past climates; modeling and predicting climate change.

(Spring)

3138 Hydrogeology (3)

Brown

Principles and theory of basic and applied hydrology: surface water hydrology, geology of groundwater systems, groundwater flow, surface water-groundwater interactions, contamination and remediation technologies, conservation, management, and

regulations. Prerequisite: Geol 2111, 2122; Math 1221 or 1231; or permission of instructor.

Laboratory fee. (Spring, alternate years)

3140 **Geochemistry** (3) Teng

Chemical systems and processes on the planet Earth; origins and interactions among and within the Earth's lithosphere, oceans, and atmosphere; origin, distribution, and behavior of the elements; radioactive and stable isotope systems. Aqueous geochemistry; geochemical cycles. Prerequisite: Geol 1001 or 1005; Chem 1111–12 or equivalent. Same as Chem 3140.

3189 **Geophysics** (3) Staff

Principles of magnetic, gravity, seismic and electrical methods applied to geological problem-solving. Prerequisite: Geol 2122 or permission of instructor. (Spring)

3191 **Geology of Energy Resources** (3) Brown

Principles of geology applied in energy exploration, exploitation, and production; the geology of energy resources in ocean basins; borehole and surface geophysical applications and reconnaissance mapping techniques; management and regulation of energy resources; sustainability, efficiency, and conservation issues. Prerequisite: Geol 2122 or permission of instructor. Laboratory fee.

4195 **Geological Field Methods** (4) Tollo

Weekend field trips. Methods of outcrop analysis, geologic mapping, and data interpretation. The geological evolution of the central Appalachian mountains and the plate tectonic processes responsible for their formation emphasized. Prerequisite: Geol 2111, 2122. Field trip fee. (Spring)

4199 **Undergraduate Research or Reading** (arr.) Staff

Problems approved by the staff. May be repeated for credit.

GERMAN

See **Romance, German, and Slavic Languages and Literatures**.

GREEK

See **Classical and Near Eastern Languages and Civilizations**.

HEALTH SCIENCES

The following courses, offered by the Health Sciences Programs in the School of Medicine and Health Sciences, are available to undergraduates across the University and pertain to the secondary field in health sciences. For information on degree programs in health sciences and additional courses that may apply to the secondary field in health sciences, see www.gwumc.edu/healthsci. For courses that pertain to the secondary field in emergency health services, see www.gwumc.edu/healthsci/programs/ems_sfs/.

2101 Psychosocial Aspects of Health and Illness (3)

Comprehensive introduction to the psychological and social aspects of health and wellness. Emphasis on the development of communication skills and the establishment of caring relationships. Discussions of special situations such as working with dying patients and patients with self-destructive behaviors.

2102 Pathophysiology (3)

Biomedical and scientific framework for the understanding of human disease mechanisms and biologic processes. Overview of infectious, immunologic, cardiovascular, genetic, respiratory, gastrointestinal, neoplastic, reproductive, renal, hematologic, neurologic, and musculoskeletal diseases.

2103 Health Policy and the Health Care System (3)

Incorporates economic theory and policy analysis methodology to analyze the impact of changes in the health care system on the practice of health sciences professionals and the quality and process of health care. Development of critical thinking skills through review of current medical literature.

2104 Management of Health Science Services (3)

Application of management and organizational principles to the delivery of services provided by health sciences disciplines. Issues addressed include information systems, leadership, team building, fiscal management, human resources management, quality improvement, and management of conflict and change.

2105 Current Issues in Bioethics (3)

Basic issues, approaches, and requirements of ethically acceptable decision making with patients, including patient confidentiality, conflicts of interest, allocation of scarce resources, occupational risks in health care, and professional responsibility for overall quality of care.

HEBREW

See Classical and Near Eastern Languages and Civilizations.

HISTORY

Professors R. Thornton, P.F. Klarén, W.H. Becker (*Chair*), L.P. Ribuffo, E. Berkowitz, R.H. Spector, L.L. Peck, R.J. Cottrol, D.K. Kennedy, A.M. Black (*Research*), M.A. Atkin, T. Anbinder, H.L. Agnew, A.J. Hildebeitel, E. Arnesen, J. Weissman Joselit, R.B. Stott, D. Silverman, A. Zimmerman, E.H. Cline, J. Hershberg
Associate Professors E.A. McCord, C.E. Harrison, D.R. Khoury, D. Yang, S. McHale, H.M. Harrison, N. Blyden, M. Norton, G.A. Brazinsky, K. Schultheiss, C. Klemek

Assistant Professors S.N. Robinson, D. Schwartz, A. Smith II, E. Chapman, C.T. Long, B.

Hopkins, J. Kim, S. Miller, T. Christov, D. Brunsman, G. Childs

Instructor J. Krug

Adjunct Professors K. Bowling, A. Howard, L. Strauss

Professorial Lecturer S. Wells

Post-Doctoral Fellow J. Shea

Bachelor of Arts with a major in history—The following requirements must be fulfilled:

1. The general requirements of Columbian College of Arts and Sciences.
2. Required courses in related areas—Two semesters of a single foreign language or placement into the third semester of a foreign language by examination.
3. Three introductory courses chosen from Hist 1011, 1110, 1120, 1121, 1310, 1311.

Credit in lieu of these courses may be obtained by scoring 4 or 5 on the Advanced Placement Examination; waiver for these courses may be obtained by scoring 650 or above on the SAT World or American History test. Neither waiver nor credit is awarded by CLEP subject examination.

4. Majors must complete a Majors' Introductory Seminar and either Hist 4098 or 4099. Eight courses must be chosen from groups (a), (b), and (c), below, with the following distribution: at least two courses from each group, with the other two courses chosen from any of the three groups or from any courses in the Hist 3000s. Of all the courses taken for the major, one must focus on the period before 1750; such courses include Hist 2112, 2113, 2803, 2804, 3030, 3038, 3103, 3111, 3118, 3130, 3132, 3134, 3140, 3150, 3180, 3302, 3510, 3520, 3610, 3710, 3810, and 4135. Certain offerings of Majors' Introductory Seminar

and Special Topics courses offered by the History Department may also fulfill the period requirement. Each section of Hist 3001, 3101, 3301, 3501, 3601, 3701, and 3801 fulfills one category of the requirements for the major.

(a) Europe—Hist 2112, 2113, 2710, 2730, 3030, 3031, 3038, 3039, 3045, 3047, 3060, 3061, 3334, 3820, and all courses within the Hist 3100–3299 range.

(b) United States—Hist 2010, 2011, 2020, 3060, and all courses within the Hist 2300–2449, 3030–3049, and 3300–3449 ranges.

(c) Asia, Africa, Middle East, and Latin America—Hist 2730, 2803, 2804, 3031, 3035, 3039, 3045, 3046, 3137, appropriate Sophomore Seminars, and all courses within the Hist 3500–3899 range.

Special Honors—For Special Honors in history, a history major must (1) meet the general honors requirements listed under University Regulations; (2) have an overall GPA of 3.3 and a GPA of 3.5 in the major at the time of graduation; (3) complete Hist 4099 with a grade of *A* or *A–*.

Minor in history—Undergraduate students who select a minor in history must ordinarily declare their intention to a departmental advisor no later than the beginning of their senior year. To meet the departmental requirements for a minor, the student must complete one course chosen from Hist 1011, 1110, 1120, 1121, 1310, or 1311 and at least five upper-division history courses numbered 2000 and higher.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: History majors should note that only one Majors' Introductory Seminar can be counted toward the major; the course is usually taken in the sophomore year. Specific topics of both Majors' Introductory Seminars and Special Topics courses are announced in the Schedule of Classes.

Course Accessibility: All listed courses are open to students without history course prerequisites with the exception of Hist 3095, 4098, and 4099.

1011 **World History, 1500–Present** (3) Hopkins, D. Kennedy, Childs, and Staff

An introduction to world history over the past half millennium, stressing themes of exchange and integration, tracing the ways various peoples of the world became bound together in a common system.

1020 **Women in Western Civilization** (3) Staff

Same as WStu 1020.

1110–20 **European Civilization in Its World Context** (3–3) Staff

Introduction to the history of Europe, emphasizing primary sources and their interpretation. Hist 1110: from the beginning of written culture through 1715. Hist 1120: from 1715 to the present.

1121 **The War of Ideas in European and International History, 1750–Present** (3) Zimmerman

The ideas that made people fight, from the French Revolution to the worldwide uprisings of the 1960s and beyond. Key texts whose ideas of freedom and slavery, tradition and progress, state authority and revolutionary violence changed the world. The political, economic, and social contexts and effects of these texts.

1310–11 **Introduction to American History** (3–3) Staff

The political, social, economic, and cultural history of the United States. Hist 1310: from the earliest settlements to 1876. Hist 1311: from 1876 to present.

2005 **Majors' Introductory Seminar (3)** Staff

2010 **Early American Cultural History (3)** Staff

Same as AmSt 2010.

2011 **Modern American Cultural History (3)** Staff

Same as AmSt 2011.

2020 **Washington, D.C.: History, Culture, and Politics (3)** Staff

Same as AmSt 2020.

2105 **Majors' Introductory Seminar: Europe (3)** Staff

2112 **Early Aegean and Greek Civilizations to 338 B.C. (3)** Cline

Neolithic background; Bronze Age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the Macedonian conquest. Same as Clas 2112.

2113 **The Roman World to 337 A.D. (3)** Cline, Smith

Prehistoric Italy; rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule. Same as Clas 2113.

2305 **Majors' Introductory Seminar: United States (3)** Staff

2320 **U.S. Media and Cultural History (3)** Staff

Same as AmSt 2320.

2340 **U.S. Diplomatic History (3)** Hershberg, Brazinsky

American foreign relations in the 20th century.

2350 **U.S. Religion and Politics (3)** Staff

Same as AmSt 2350.

2380 **Sexuality in U.S. History (3)** Staff

Same as AmSt/WStu 2380.

2410 **20th-Century U.S. Immigration (3)** Staff

Same as AmSt 2410.

2440 **The American City (3)** Staff

Same as AmSt 2440.

2490 **Themes in U.S. Cultural History (3)** Staff

Same as AmSt 2490.

2505 **Majors' Introductory Seminar: Africa (3)** Staff

2605 **Majors' Introductory Seminar: Asia (3)** Staff

2705 **Majors' Introductory Seminar: Latin America (3)** Staff

2710 **The United States in Global Context, 1898–Present (3)** Staff

Same as AmSt 2710.

2730 **World War II in History and Memory (3)** Staff

Same as AmSt 2730.

2803 **The Ancient Near East and Egypt to 322 B.C. (3)** Cline

Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to Alexander's conquest. Same as Clas 2803.

2804 **History of Ancient Israel (3)** Cline

The history of ancient Israel from the Patriarchs through the Romans. Topics include historical, archeological, political, social, cultural, religious, diplomatic, military, economic, and intellectual events, movements, and relationships. Same as Clas 2804.

2805 **Majors' Introductory Seminar: Middle East** (3) Staff

3001 **Special Topics** (3) Staff

May be repeated for credit provided the topic differs.

3030–31 **Military History** (3–3) Long

Causes, conduct, and consequences of warfare in the West. Hist 3030: to 1860. Hist

3031: Since 1861. (Academic year)

3033 **War and the Military in American Society** Spector

from the Revolution to the Gulf War (3)

Social and psychological dimensions of war and military service.

3035 **The United States and the Wars in Indochina, 1945–1975** (3) Spector

The American role in the Indochina Wars, emphasizing the period 1961–1975, and from the perspectives of the Vietnamese, French, and Americans in Vietnam. Related intellectual and political developments in the United States; Cold War relationships with China and the Soviet Union.

3038–39 **Naval History** (3–3) Long

Hist 3038: The age of sail—to 1815. Hist 3039: The age of steam and steel—since 1815. (Academic year)

3045 **International History of the Cold War** (3) H. Harrison, Hershberg

Key events and themes of the Cold War, drawing on new evidence from U.S., Soviet, Chinese, German, East European, Vietnamese, Cuban, and other sources. Related historiographical controversies from multiple national perspectives. Why the Cold War began, why it lasted for 45 years, and why it ended.

3046 **The Cold War in the Third World** (3) Brazinsky

The evolution of the Cold War in Asia, Africa, and Latin America. Decolonization and the response of the Great Powers, the political economy of the Third World, and American and Soviet interventions.

3047 **Writing Cold War History** (3)

Thornton

Seminar. Students prepare a research paper on selected topics in the history of the Cold War.

3060 **Modern Jewish History** (3)

Schwartz

A secular history of the Jewish people from the 18th century to the present state of Israel; emphasis on European and Middle Eastern political, economic, and cultural influences.

3061 **The Holocaust** (3)

Schwartz

The origins, causes, and significance of the Nazi attempt to destroy European Jewry, within the context of European and Jewish history. Related themes include the behavior of perpetrators, victims, and bystanders; literary responses; contemporary implications of the Holocaust for religion and politics.

3095 **Internship** (1 to 3)

Staff

Study of history through internships in museums, libraries, Congress, or other appropriate institutions and agencies. Prerequisite: approval of a departmental faculty member.

3097 **Independent Study** (1 to 3)

Staff

Permission of instructor required.

3101 **Topics in European History** (3)

Staff

3103–4 **European Intellectual History** (3–3)

Christov

Hist 3103: The “Century of Genius” and the Enlightenment; God, nature, man, and society, from Descartes to the French Revolution. Hist 3104: Responses to the French Revolution and the Enlightenment; historicism, evolution; nihilism, psychoanalysis; communism; fascism; existentialism, structuralism, postmodernism, and neo-orthodoxy.

3111 **Topics in Ancient History (3)** Cline, Smith

Same as Clas 3111.

3118 **The Middle Ages: 500–1500 (3)** Miller

The evolution of European society from the end of the Roman Empire to the Renaissance. The nature of political power, role of religion, place of gender, cultural production, and changing social structures.

3124 **19th-Century Europe (3)** Zimmerman, Schwartz

Exploration of primary source documents and works of professional historians to introduce important issues of 19th-century European history.

3125 **Europe in the 20th Century (3)** Schultheiss

Diplomatic, political, and cultural developments from the turn of the century to the present.

3126 **European Integration: A History (3)** Wells

An examination of the origins and development of the European Union.

3130–31 **History of England (3–3)** Peck

Development of English civilization and its impact on Western culture. Hist 3130: To 1689. Hist 3131: Since 1689.

3132 **Tudor England (3)** Peck

Aspects of the constitutional, social, intellectual, economic, and religious development of England, 1485–1603.

3134 **Stuart England** (3)

Peck

The civil wars, Restoration, and Glorious Revolution. Political, religious, socioeconomic, and intellectual developments in England, 1603–1714.

3135 **Victorian Britain** (3)

Kennedy

Major themes in 19th-century British history: industrialism, democratization, urbanization, imperial expansion, class and gender schisms.

3137 **The British Empire** (3)

Kennedy

The British Empire from its rise in the 17th century to its demise in the 20th century.

3139 **20th-Century Britain** (3)

Kennedy

Major themes of 20th-century British history: industrial decline, imperialism and decolonization, the making of a welfare state, the cataclysm of global war, integration with Europe.

3140–41 **History of France** (3–3)

Schultheiss

Hist 3140: Old Regime: monarchy and social classes; the Church; the Enlightenment; the 1789 revolution; Napoleon. Hist 3141: From 1814: breaks and continuities in the succession of regimes; the interplay between revolution and tradition; the weakened international position of France; Gaullism and the survival of France; European Unity.

3145 **The French Revolution** (3)

Staff

Social, political, economic, and cultural history of the decade of revolution, 1789–1799. Attention to its structural consequences in France and in Europe at large.

3150 **Spain and Its Empire, 1492–1700** (3)

Norton

Major transformations of the period: from cultural pluralism to ethnic homogeneity, from medieval fragmentation to imperial expansion in Europe and America; from religious reform to Catholic Reformation, from global dominance to decline.

3160 **History of Germany (3)** Zimmerman

Political, social, and cultural development. From 1815 to the present.

3168 **The Two Germanys and the Cold War (3)** H. Harrison

Why was Germany divided after World War II? Why did it stay divided for 45 years? How was it reunited in 1990? This course examines developments in East and West Germany, relations between the two Germanys during the Cold War, their foreign policies, and how other countries treated them.

3173 **The Habsburgs in East Central Europe (3)** Agnew

History of the Habsburg monarchy in its East Central European context. Reformation and Counter-Reformation; conflict with the Ottoman Empire; great-power competition in Europe; response to the Enlightenment and the French Revolution; the rise of nationalism; and final dissolution in World War I.

3178 **The Making of the Modern Balkans (3)** Agnew

States of the Balkan peninsula—Slovenia, Croatia, Serbia and Montenegro, Bosnia, Albania, Macedonia, Greece, Bulgaria, and Romania—including developments since the decline of the Ottoman Empire and the emergence of Balkan nationalist movements, and continuing through the collapse of the Soviet bloc.

3180 **Russia to 1801 (3)** Atkin

Survey of Russian history from the rise of the Kievan confederation in the ninth century to the establishment of Imperial Russia as a European great power. Attention will

be given to the political, socioeconomic, and cultural history of the East Slavs, especially the Russians.

3181 **Russia Since 1801** (3) Atkin

Survey of Russian and Soviet history from the reign of Alexander I to the Stalin era. Attention will be given to the contending forces of revolution, reform, and conservatism; diplomatic relations; economic development; and social change.

3301 **Topics in U.S. History** (3) Staff

3302 **America Before 1764** (3) Silverman

An examination of prehistory, colonization, and the shifting dynamics among European Americans, African Americans, and Native Americans before 1764.

3303 **Revolutionary America** (3) Silverman, Brunsman

An examination of the War of Independence and other events that reshaped life for Native Americans, African Americans, and European Americans in the era of the American Revolution; emphasis on a continental approach to the period.

3304 **George Washington and His World** (3) Brunsman

George Washington's life as soldier, politician, entrepreneur, slave holder, and national icon. Emphasis on the interpretation of original sources, including historical documents and the material culture of Washington's Mount Vernon estate, with tours and lectures by curators and historians. Departmental permission is required for registration.

3311 **The Jacksonian Era and the Rise of Mass Politics** (3) Anbinder, Stott

The period 1828–1850 and its continuing significance to American society; emphasis on national politics and the emerging sectional conflict.

3312 **Civil War and Reconstruction** (3) Anbinder

How tensions between the sections developed into violence, how a total war was fought on American soil, and how Reconstruction shaped the making of modern American politics and race relations.

3313 **History of the American West (3)** Stott

The interaction of environment and cultures among the different peoples vying for occupancy of the trans-Mississippi region of the United States from the early 19th century to the present.

3320 **U.S. History, 1890–1945 (3)** Ribuffo, Berkowitz

Political, social, diplomatic, and intellectual developments, with particular emphasis on the “searching” ’20s and New Deal.

3321 **Contemporary U.S. History Since 1945 (3)** Ribuffo, Arnesen

Political, social, diplomatic, and intellectual developments, with particular emphasis on the Cold War, “silent” ’50s, and disrupted ’60s.

3322 **The Modern American Presidency (3)** Berkowitz

The development of the modern American presidency, from Theodore Roosevelt to Bill Clinton, examining the intersection of personal and impersonal forces in the creation of modern America.

3324 **U.S. Urban History (3)** Klemek

Same as AmSt 3324.

3332–33 **History of American Foreign Policy Since World War II (3–3)** Thornton

Emphasis on American and Soviet strategy and foreign policy in the era of the Cold War. Hist 3332: World War II to the Vietnam War; Hist 3333: Vietnam to the “New World Order.”

3334 **The Nuclear Arms Race** (3) Hershberg

Political, military, diplomatic, scientific, and cultural consequences of the advent of nuclear weapons. The development and uses of the atomic bomb during World War II and the course and legacy of the U.S.–Soviet nuclear arms race during the Cold War.

3351 **U.S. Social History** (3) Stott

The urban–industrial era from 1861 to present. Same as AmSt 3351.

3352–53 **Women in the United States** (3–3) Murphy, C. Harrison

Survey of women’s experience in U.S. history, the way gender has organized relations of power, and the impact of race, region, class, and ethnicity on women and on gender roles. Same as AmSt/WStu 3352–53.

3360–61 **African American History** (3–3) Chapman

Survey of the African American experience, emphasizing the contributions of black Americans to and their impact upon American history. Same as AmSt 3360–61.

3362 **Black Women in U.S. History** (3) Chapman

Black women from the Middle Passage to contemporary times. Same as AmSt/WStu 3362.

3366 **Immigration, Ethnicity, and the American Experience** (3) Anbinder

Examination of the role of immigration, ethnicity, and ethnic conflict in American life, with particular attention to the urban immigrant experience from 1820 to 1924.

3367 **History of the Jewish People in America** (3) Strauss and Staff

The study of the Jewish minority in America from colonial times to the present. Emphasis on the interaction between a powerful majority culture and that of protean minority people.

3370 **U.S. Constitutional History (3)**

C. Harrison

Examination of the text and interpretation of the document that is the foundation of the American government, with special attention to the changing character of race and gender as constitutional classes.

3501 **Topics in African History (3)**

Blyden, Krug, Childs

3510 **African History to 1880 (3)**

Blyden, Krug, Childs

Survey of the history of the African continent with emphasis on the history of sub-Saharan Africa.

3520 **Africans in the Making of the Atlantic World (3)**

Blyden, Krug, Childs

The role of Africa and Africans in the Atlantic world with emphasis on links between Africa, Europe, and the Americas.

3530 **Women in Africa (3)**

Blyden

African women from prehistory to the present, focusing on culture, the role of gender, and outside influences and their impact on women's history. Same as WStu 3530.

3540 **West Africa to Independence (3)**

Blyden

A thematic survey of West African history, focusing on the diversity of African culture, West African kingdoms and empires, Islam, the trans-Saharan trade, African contact with Europe, slavery and the slave trade, and the colonization of Africa.

3601 **Topics in Asian History (3)**

Staff

3610 **China to 1800 (3)**

McCord

Survey of Chinese civilization from its ancient beginnings to the last imperial dynasty.

3611 **History of Modern China (3)**

McCord

China since 1840, with particular attention to political developments.

3614 **Writing Modern Chinese History (3)** Thornton

Seminar. Students prepare a research paper on selected topics in the history of modern China.

3615 **History of Chinese Communism (3)** Thornton

Survey of the leadership, ideology, structure, and foreign and domestic policies of the Chinese Communist Party from its inception to the present.

3621 **History of Modern Japan (3)** Yang

Japan's century of modernization—from the Meiji Restoration of 1868 to the present. Emphasis on historical, political, economic, and cultural factors.

3630 **History of Korea (3)** Kim

An introductory survey of the history and culture of Korea from antiquity to the present.

3631 **History of Modern Korea (3)** Kim

Modern Korean history from 1876 to contemporary society. Emphasis on colonialism, nationalism, the division of peninsula, the Cold War, and globalization.

3640 **History of Southeast Asia (3)** McHale

An examination of Vietnam and its neighbors from the pre-colonial period to the present.

3650 **Modern South Asia, 1750–Present (3)** Hopkins

The South Asian subcontinent, including Afghanistan, Pakistan, India, and Bangladesh, since the mid-18th century. The period of British rule, from the late 18th to the mid-20th century. The different trajectories of the independent nation-states of South Asia following decolonization.

3701	Topics in Latin American History (3)	Staff
3710–11	History of Latin America (3–3)	Klarén, Childs
Hist 3710: Analysis of Spanish and Portuguese imperialism in the New World, 1492–1820. Hist 3711: A problems approach to Latin America, 1820 to the present; thematic emphasis on neocolonialism, corporatism, liberalism, <i>caudillismo</i> , modernization, populism, and revolution.		
3801	Topics in Middle Eastern History (3)	Staff
3810	History of the Middle East to 1800 (3)	Khoury
Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states.		
3811	The Middle East in the 20th Century (3)	Robinson
The state system established after World War I. Effects of colonialism, the rise of nationalism, the Cold War, and the oil industry. The modes of identification that accompanied these processes, including pan-Arabism and Islamism.		
3820	History of Israel (3)	Schwartz
A history of Israel from the origins of Zionism and the British Mandate through the Oslo Accord and its legacy.		
3830	History of Iraq (3)	Khoury
Modern Iraq's Ottoman background; its incorporation into a world market dominated by Europe, British influence and preconceptions in the creation of Iraq, and the emergence and survival of the Ba'ath dictatorship. Reforms in economic, political, and educational spheres.		

3840 **History of Central Asia (3)** Atkin

Introduction to the political, cultural, religious, and social history of the region, including Afghanistan, Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan.

3850 **Modern Iran (3)** Atkin

Political, diplomatic, religious, and other developments in Iran from about 1800 to 1989.

4098 **Thesis Seminar (3)** Staff

For history majors only. Preparation of a research paper using primary sources.

4099 **Senior Honors Thesis (3)** Staff

Required of and open only to undergraduate honors candidates in history. Prerequisite: permission of the thesis director must be obtained the semester before registration.

4135 **Folger Seminar (3)** Staff

The history of books and early modern culture. Use of the archive at the Folger Shakespeare Library. Students must obtain departmental approval in the preceding semester. Same as Engl/Fren 4135.

HONORS

Executive Director M. Frawley

Assistant Professors W. Winstead, R. Shepherd, E. Aviv, B. Kung, M. Ralkowski, T. Christov

University Honors Advisory Committee

R. Heller (*Chair*), H. Agnew, N. Blyden, L. Chang, C. Dowd, S. Levy, D. Malone-France, B. Narahari, T. Neilsen, W. Reich, K. Roddis, B. Westerman, T. Zawidzki

The University Honors Program offers exceptional entering students the opportunity to engage in a distinctive, participatory program of study designed to prepare them—whatever their gifts and interests might be—to meet the complex challenges of the 21st century. The program invites students to develop a humane perspective on the world. It sustains a community where students and faculty learn from each other, inspired by academic challenge, hard questions, and a desire to make a difference. The program serves approximately 500 selected students, or five percent of GW’s undergraduate student body. Incoming students may apply to the Honors Program at the time they apply to the University; a small group of rising sophomores may also apply.

The program is characterized by small, seminar-style classes with enrollments capped at 15–20 students; faculty who serve as mentors, models, and guides in the learning process; classroom approaches that call upon students to initiate inquiry, work collaboratively, and drive the exploration and learning process; interdisciplinary tools and modes of inquiry; and global or cross-cultural perspectives and course content.

In their first year, along with other courses, Honors Program students take Honr 1015, 1016, and 1033–34; in the second, third, and fourth years, they take Honr 2047–48 and 2053–54 and pursue course work in their majors, including special or departmental honors and/or independent or mentored research. All Honors students participate in the capstone course, Honr 4199, and complete a departmental or Honors senior thesis or project. The Honors proseminars meet certain general curriculum and elective requirements of the

respective undergraduate schools. Honr 1015 is the required University Writing course for Honors students.

In order to remain in good standing, Honors Program students must enroll in at least 12 credit hours each semester and, except for the first year, maintain a cumulative GPA of 3.4 or higher. First-year students must achieve a cumulative GPA of at least 3.0. Successful participation in the program is recognized and recorded on a student's official transcript.

1015 Honors Proseminar: UW 1020: Origins and Evolution of Modern Thought (4)

Exploration of significant exemplars, milestones, and developments of human thought; foundational and representative thinkers and texts from Western and Eastern traditions provide an indication of the diversity and complexity of attempts to articulate responses to universal questions, problems, and aspirations.

1016 Honors Proseminar: Origins and Evolution of Modern Thought (4)

Continuation of Honr 1015. Key developments and trajectories in human thought and inquiry into modern times.

1033–34 Honors Proseminar: Scientific Reasoning and Discovery (4–4)

Using an inquiry-based approach, students learn to identify hidden regularities and patterns in nature that may indicate fundamental unifying principles and laws. The scientific method; evaluation of scientific information; limitations of the scientific process; development of a scientific hypothesis. Tools and methodologies of geology, chemistry, physics, biology, anthropology, and other disciplines.

2016 Enlightenment East and West (3)

This course replaces Honr 1016 for students who enter the Honors Program as sophomores.

2043 Honors Microeconomics (3)

An introductory microeconomics course that considers both the philosophical basis of economics as well as its methods and applications.

2044 Honors Macroeconomics (3)

An accelerated introductory macroeconomics course that includes the study of special topics.

2047–48 Honors Proseminar: Social and Behavioral Sciences (3–3)

Using the tools and modes of inquiry of the social and behavioral sciences, students find ways to understand significant social and political phenomena. Relationships among individuals, collectivities, families, and communities; interactions of psychological, social, political, economic, and historical forces at work in a given culture.

2053–54 Honors Proseminar: Arts and Humanities (3–3)

Using an array of artistic forms (poetry, prose literature, drama, film, painting, sculpture, architecture, dance, and music), students explore the ways cultures are defined and understood through artistic expression, and the ways in which particular cultures value and critique these forms of personal and social expression.

2175 Honors Special Topics (1 to 4)

2184 Honors Undergraduate Research (1 to 4)

Independent or faculty-mentored research resulting in a significant written or other product. (Fall and spring)

2185 Honors Research Assistantship (1 to 4)

Students provide substantive assistance to a faculty member engaged in scholarly or scientific research.

4198 Honors Senior Thesis (3 or 4)

One- or two-semester thesis under faculty guidance. May be repeated for credit.

4199 Honors Capstone Experience (1 to 4)

Students re-engage with core questions and issues related to the Honors Program curriculum, reflecting on their learning in relation to enduring questions and challenges of our world.

INFORMATION SYSTEMS AND TECHNOLOGY MANAGEMENT

Professors E.J. Cherian, M.J. Granger, E.G. Carayannis

Associate Professors R.G. Donnelly, W.H. Money, J. Artz, S. Dasgupta (*Chair*)

Assistant Professors R.A. Lumley, W. Duan

See the School of Business for programs of study leading to the Bachelor of Business Administration and the combined degree program leading to the Bachelor of Business Administration and Master of Science in Information Systems Technology.

3119 Introduction to Programming (3) Staff

For students already familiar with basic computer concepts, who will learn a programming language, such as Visual Basic, useful for business applications. Emphasis on computer applications in accounting and management information systems through hands-on programming. Prerequisite: BAdm 2301. (Fall and spring)

4120 Structured Development with CASE (3) Granger, Dasgupta

Analysis, design, and implementation of management information systems (MIS). Structured methodologies and techniques for various stages of the MIS development process. Computer-aided software engineering tools. May be taken for graduate credit with permission of program director and instructor. Prerequisite: ISTM 3119 or permission of instructor.

(Fall and spring)

4121 **Database Design and Applications (3)** Granger

Theory, architecture, and implementation of database management systems in corporate and organization information systems. Fundamental concepts of database management and processing. Hands-on experience with database management packages.

Prerequisite: ISTM 3119 or permission of instructor. (Fall and spring)

4123 **Business Data Communications (3)** Staff

A technical overview of data communication concepts that are useful in the design and management of local and wide area networks. Internet technologies and their business applications are emphasized. Prerequisite: BAdm 2301. (Spring)

4130 **Writing on the Ethics of Technology (3)** Artz

Complex ethical dilemmas inherent in the introduction of new technologies and the influence human behavior asserts on these problems. Students write stories to explore and evaluate specific ethical problems relative to technology from various perspectives.

4900 **Special Topics (3)** Staff

Experimental offering; new course topics and teaching methods. May be repeated once for credit.

4995 **Independent Study (3)** Staff

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

INTERIOR ARCHITECTURE AND DESIGN

Associate Professor S. Travis (Director)

Assistant Professors E. Speck, N. Evans, C. Anderson, N. Volchansky

Bachelor of Fine Arts with a major in interior architecture and design—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. 12 credit hours of fine arts and art history courses, consisting of AH 2145, 2161, and FA 1017, 1021; 60 credit hours of interior architecture and design courses, consisting of IntD 2200 through 4602. The program is available on a full-time basis only.

Note: Enrollment in interior architecture and design courses requires candidacy in the degree program or permission of the program director. A course fee is charged for all IntD courses.

2200 Studio 1 (6)

Introduction to the design process through consideration of the theory and application of design principles and elements to specific studies of the built environment.

2201 History of Modern Architecture and Design (3)

Overview of 20th- and 21st-century architecture, interiors, and furniture of significant and unique houses and smaller commercial buildings.

2202 Sustainability/LEED: Architecture and Design (3)

Consideration of the process by which structures and spaces can be awarded LEED (Leadership in Energy and Environmental Design) certification and the examination that enables individuals to become LEED-accredited professionals.

2300 Studio 2 (6)

All phases of design, beginning with development of a concept through producing a complete presentation. How a project evolves from program requirements to a creative and functional interior.

2301 Graphic Communications (3)

Development of multimedia techniques in rendering. Advanced three-dimensional drawing using rapid visualization techniques, sketching, and constructed drawings.

2302 Digital Drafting and Modeling (3)

Introduction to CAD technology, two-dimensional drawings, plotting and enhancement of presentations. Use of CAD for the production of construction drawings.

3400 Studio 3 (6)

Multifaceted and complex problems in commercial design, including codes and regulations pertaining to commercial interiors; development of collaborative learning.

3401 Interior Materials (3)

All phases of textile production, including standards, testing, and specifications. Properties, regulations, and installation of interior finish materials.

3402 Sketching Architecture and Interiors (3)

Free-hand sketching developed and applied as a tool in all phases of the creative design process.

4500 Studio 4 (6)

Continuation and refinement of the design process to further advance conceptual thinking for development of larger-scaled and more complex design problems.

4501 Lighting and Acoustics (3)

Terminology, concepts, and principles of lighting design. Light and energy, incandescent and gaseous discharge lamps, luminaries, task requirements, measurement and calculations, human factors, and design applications. Acoustic principles as they relate to building design.

4502 Pre-Design for Studio 5 (3)

Application of advanced topics in design theory; research methodology applied to development of the graduate project.

4600 Studio 5 (6)

Culmination of skills and knowledge accumulated through the program as demonstrated by development of an interior design project covering all aspects from conception through presentation.

4601 Professional Practice (3)

Students work with professional interior designers or architects or industry-related professionals, participating in a project-based setting. Roles and responsibilities of the professional interior designer: business procedures, legal implications, ethics, trade relations, designer-client-contractor relations.

4602 Structures and Building Systems (3)

Organization and preparation of construction documents; methods and materials; and application of codes. Building systems (mechanical, electrical, plumbing) as related to function and design of interior spaces.

INTERNATIONAL AFFAIRS

University Professors M. Barnett, L.A. Etzioni, M. Finnemore, B. Wood

Professors H.L. Agnew, H.G. Askari, M.A. Atkin, W.H. Becker, E. Berkowitz, S. Biddle,

A. Black (*Research*), B.L. Boulier, M.D. Bradley, J. Brinkerhoff, A. Brooks, M.E.

Brown, N.J. Brown, J. Chaves, B. Chiswick, J.J. Cordes, W.K. Cummings, H.J. Davis,

C.J. Deering, B.J. Dickson, P. Ehrenfreund (*Research*), R. Eisen, R.M. Entman, H.B.

Feigenbaum, J. Ferrer (*Research*), C. Fink (*Practice*), J. Foster, L. Fuerth (*Research*),

C. Glaser, E.W. Gnehm, R. Grinker, S. Hamano, J. Hershberg, H. Hertzfeld

(*Research*), G. Kaminsky, D.K. Kennedy, R.E. Kennedy, Jr., Y.K. Kim-Renaud, P.F.

Klarén, J. Kuipers, M. Laruelle (*Research*), J.H. Lebovic, S. Livingston, R. Maguire

(*Practice*), M. Marquardt, C. McClintock, B.D. Miller, M.O. Moore, H.R. Nau, S.

Pace (*Practice*), J. Pelzman, J.M. Post, M. Price, S. Rehman, W. Reich, L.P. Ribuffo,

R. Robin, F. Robles, P. Rollberg, R.W. Rycroft, S. Sell, F. Sesno, D. Shambaugh, J.

Sherry, S.C. Smith, M. Sodaro, R.H. Spector, R. Steinhardt, I. Sud (*Practice*), R.

Sutter (*Practice*), R. Thornton, N.S. Vonortas, P. Wahlbeck, S. Waisman, R. Weiner,

S. Wolchik, H.L. Wolman, J. Yang, A.M. Yezer, A. Zimmerman

Associate Professors S. Aaronson (*Research*), S. Aday, M. Ayyagari, S. Balla, J. Blomster,

N. Blyden, A. Bowie, G. Brazinsky, Y. Captain, A. Castleman (*Research*), E. Chacko,

M.X. Chen, R.W. Click, I. Creppell, A.S. Dent, A. Downes, D.S. Eglitis, M. Esseezy,

H.J. Farrell, I. Feldman, A. Fostel, M. Gonglewski, D.A. Grier, H.E. Hale, H.M.

Harrison, M. King (*Research*), D. Khoury, S. Lubkemann, M. Lynch, M. McAlister,

E.A. McCord, S. McHale, M.M. Mochizuki, K. Morgan, D. Ollapally (*Research*),

D.R. Rain, L.A. Riddle, S. Roberts (*Practice*), R.M. Samaniego, J. Shambaugh, T.

Sinclair, J. Spear, J. Spencer, M.B. Stein, S. Suranovic, E.J. Teitelbaum, P.D.

Williams, J.H. Williams, D. Yang, P.N. Zhang

Assistant Professors C. Arrington, M. Atia, E. Aviv, P. Carillo, L. Engel, I.L. Hanami, B.

Hopkins, L. Hughes, S. Jandhyala, R. Jedwab, S. Kaplan, M. Kelso, J. Kim, G.M.S.

Lambright, R. Lucea, C. Mylonas, S. Robinson, E. Saunders, D. Shaw, R.J. Shepherd,

C. Talmadge, O. Timoshenko, E. Uretsky,

See the Elliott School of International Affairs for Bachelor of Arts programs in international affairs, Asian studies, Latin American and hemispheric studies, and Middle East studies.

1005 **Introduction to International Affairs:** Staff
 A Washington Perspective (4)

Open only to first-year students in the Elliott School. An introduction to the study of international affairs, integrating material designed to orient students to the Elliott School, the University, and the city of Washington. Students who have transferred into the Elliott School should take PSc 1003 instead of this course. Credit may not be earned for both IAff 1005 and PSc 1003. (Fall and spring)

2040 **Basic Topics in International Affairs (3)** Staff

Topics announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Primarily for Elliott School freshmen and sophomores.

2090 **Latin America: Problems and Promise (3)** Klarén, Price

An interdisciplinary course in Latin American studies designed to introduce undergraduates to the diverse, rich, and complex history, politics, economy, culture, and society of Latin America. (Fall)

McCord, McHale, D. Yang

An interdisciplinary course offering a comprehensive and integrated introduction to the civilizations and present problems of East Asia.

(Spring)

Staff

A multidisciplinary introduction to the lands and cultures of the former Soviet Union and Central and Eastern Europe. The main emphasis is on history and politics, with attention also given to economics, trade, geography, military matters, literature, and the media. (Fall)

Staff

Aspects of the environment, culture, and politics as they affect the present and anticipated future of Africa. (Spring)

Sodaro

A multidisciplinary view of contemporary Europe, including the E.U. states, other states of Eastern Europe, and Turkey. The widening processes of political, judicial, economic, cultural, and security integration. Prerequisite: IAff 1005, PSc 1001. (Spring)

2190 **Special Topics (1 to 3)**

Staff

An introduction to Islam, as both a transnational religious tradition and a way of thinking about an important world civilization. From the 7th century C.E. to the era of modernity.

Staff

The institutions and ideas that shape U.S. foreign policy, including the U.S. Congress and administration, foreign embassies, international organizations, think tanks, interest groups, and media outlets. A separate section of the course covers issues of reporting on foreign policy issues. The program has special admission criteria. (Summer)

For IAff 3179 to 3190, topics are announced in the Schedule of Classes. The courses may be repeated for credit provided the topic differs. Prerequisite: IAff 1005 or PSc 1003; junior or senior standing.

3179	Special Topics in Science and Technology Policy (3)	Staff
3180	Special Topics in Security Policy (3)	Staff
3181	Special Topics in Conflict Resolution (3)	Staff
3182	Special Topics in Foreign Policy (3)	Staff
3183	Special Topics in Development Policy (3)	Staff
3184	Special Topics in Trade and International Economic Policy (3)	Staff
3185	Special Topics in European and Eurasian Studies (3)	Staff
3186	Special Topics in Asian Studies (3)	Staff
3187	Special Topics in Latin American and Hemispheric Studies (3)	Staff
3188	Special Topics in Middle East Studies (3)	Staff
3189	Special Topics in African Studies (3)	Staff
3190	Special Topics in International Affairs (1 to 3)	Staff
3195	Internship (0 to 3)	Staff

Internships in public, private, and nonprofit organizations concerned with international affairs. Students must meet selection criteria, find a sponsoring faculty member, and receive

approval from the Elliott School Office of Academic Advising and Student Services. May be repeated for up to 6 credits with permission.

3198 **Independent Study and Research** (1 to 3) Staff

For juniors and seniors with a minimum grade-point average of 3.0. Students must find a sponsoring faculty member and receive approval from the Elliott School Office of Academic Advising and Student Services. May be repeated for credit with permission of the dean.

4191 **Senior Seminar** (3) Staff

For Elliott School seniors only. Intensive readings, discussion, research, and writing. Students must meet selection criteria and receive approval from the Elliott School Office of Academic Advising and Student Services.

4199 **Senior Thesis** (3) Staff

For Elliott School seniors only. Students must meet selection criteria, find a sponsoring faculty member, and receive approval from the Elliott School Office of Academic Advising and Student Services.

INTERNATIONAL BUSINESS

Professors Y.S. Park, H.G. Askari, F. Robles, R. Weiner, J. Yang, S.S. Rehman, D. Guthrie,

D. Leipziger

Associate Professors R.W. Click, J. Ferrer (*Research*), J.W. Spencer (*Chair*), J. Forrer

(*Research*), L.A. Riddle, A. Phene, M. Ayyagari, H. Berry

Assistant Professors P. Dastidar, R. Lucea, S. Jandhyala, H. Bogaard, W. Chen, A. Helm

See the School of Business for programs of study leading to the degree of Bachelor of Business Administration.

Departmental prerequisite: IBus 3001 is prerequisite to all other IBus courses

except by permission of the instructor; additional prerequisites are listed with the courses.

3001 **Introduction to International Business (3)** Spencer, Riddle, Ayyagari,
Lucea, Jandhyala

The international business environment, including social, cultural, political, technological, and institutional domains. Multinational corporation strategic imperatives and organizational challenges, including financial, marketing, human resources, and other aspects of management. Prerequisite: Econ 1011–12; prerequisite or corequisite: BAdm 2201 or Econ 2181 or 2182. (Fall and spring)

3201 **International Marketing Management (3)** Robles, Riddle, Helm

Introduction to international marketing analysis and strategy, and the dynamic nature of international markets. Analysis of different types of international markets and formulation of strategies at the entry and global stages. (Fall and spring)

3301 **International Business Finance (3)** Rehman, Yang, Click,
Ayyagari, Chen

Analysis of the international economic environment and its influence on corporate financial management of international operations. Prerequisite: BAdm 3501. (Fall and spring)

4202 **Regional Strategy for Multinationals (3)** Robles

The business, economic, investment, and market environments in different world regions. The regional strategy framework and economy. Generation of regional market opportunities.

4203 **Foreign Market Analysis (3)** Robles

Project course involving market research for target market selection, market entry strategy, in-country marketing plan, and recommendations for strategy implementation in the target country. Focus on consulting process as ancillary component. Prerequisite: IBus 3201.

4302 International Banking (3) Park

Theory and practice of international banking; analysis of international commercial and investment banking from a management perspective; subjects include current international monetary and financial environment, money and capital markets, and topical problems of international banking from a management perspective. Prerequisite: IBus 3301.

4303 International Monetary and Financial Issues (3) Askari, Rehman, Yang

International macro and micro issues of money and finance examined from a management perspective. Globalization, international monetary systems, LDC debt crises, corporate governance and valuation, and the role of the IMF and the World Bank.

Prerequisite: IBus 3301 or permission of instructor.

4401 Managing the Multinational Enterprise (3) Spencer, Phene

The changing nature of the international environment and the resulting effects on strategy of U.S. and foreign multinational corporations.

4402 Managing in Developing Countries (3) Riddle, Leipziger

Challenges of operating in developing countries. Cross-country experience and case studies exploring issues of institutions, corruption, infrastructure, private–public partnerships, competition, regulation, and global standards.

4900 Special Topics (3) Staff

Experimental offering; new course topics and teaching methods.

4995 **Independent Study** (arr.)

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

ITALIAN

See **Romance, German, and Slavic Languages and Literatures**.

JAPANESE

See **East Asian Languages and Literatures**.

JOURNALISM AND MASS COMMUNICATION

See **Media and Public Affairs**.

JUDAIC STUDIES

Committee on Judaic Studies

J. Weissman Joselit (*Director*), T. Anbinder, S. Ben-Gad, N. Brown, E. Cline, J. Cohen, P. Duff, R. Eisen, E. Friedland, B. Hill, L. Jacobson, S. Marcus, F. Moskowitz, W. Reich, A. Rulnick, D. Schwartz, L. Strauss, M. Ticktin, S. Waisman, G. Wald

Columbian College of Arts and Sciences offers an interdisciplinary program in Judaic studies leading to the degree of Bachelor of Arts. This program is intended for students who wish to investigate the history, language, literature, religious and philosophical thought, and political and social experience of the Jewish people from the perspective of several academic disciplines.

(Students who wish to concentrate on the religious aspects of Judaism and its relationship to the other religious traditions of the world may prefer to elect a major in religion with an emphasis on Judaism [see Religion].) Students who

have studied abroad should verify the residence requirements of Columbian College of Arts and Sciences.

Bachelor of Arts with a major in Judaic studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite: Hebr 1001–2, 2001–2.
3. Required courses for the major—31 credits consisting of Hist 3060, Rel 3201, JStd 4018–19; eight electives chosen from lists of approved courses as follows: two additional history courses, one additional religion course, two literature courses, one arts and culture course; and an additional elective either taken from study abroad or determined in consultation with the advisor. Approved courses can be found at columbian.gwu.edu/judaic/academics/major/.

Minor in Judaic studies—Prerequisite: Hebr 1001–2. Required: six courses, including one each in history, religion, and literature, and three electives chosen from lists of approved courses at columbian.gwu.edu/judaic/academics/minor/.

Special Honors—For Special Honors in Judaic studies, a major must meet the general requirements stated under University Regulations, attain a GPA of at least 3.7 in courses counted toward the major in Judaic studies and 3.3 overall, and earn a grade of *A* both for JStd 4018–19 and for the senior thesis. Having fulfilled these requirements, the student may then be recommended for graduation with Special Honors.

4018–19 **Senior Thesis (1–3)**

For Judaic studies majors. JStd 4018: Students choose a topic in any major subfield of Judaic studies, select a faculty advisor who specializes in the subfield, conduct research, and

produce an annotated bibliography and a proposal that previews the main arguments of the thesis. JStd 4019: Completion of the thesis and oral presentation before Judaic studies students and faculty. (Academic year)

KOREAN

See **East Asian Languages and Literatures**.

LATIN

See **Classical and Near Eastern Languages and Civilizations**.

LINGUISTICS

Minor in linguistics—15 credit hours of courses in linguistics, including Anth/Ling 2601 and four courses from the following groups. Psycholinguistics—Anth/Ling 3603. Applied Linguistics—Chin/Kor 3123–24; SpHr 2130, 2131. Biological Foundations of Language—SpHr 2105, 2106. Sociolinguistics—Anth/Ling 3601, 3602.

2601 Language and Linguistic Analysis (3)

Same as Anth 2601.

3601 Language, Culture, and Cognition (3)

Same as Anth 3601.

3602 Ethnographic Analysis of Speech (3)

Same as Anth 3602.

3603 Psycholinguistics (3)

Same as Anth 3603.

3691 Special Topics in Linguistic Anthropology (3)

Same as Anth 3691.

MANAGEMENT

Professors S.A. Umpleby, E.K. Winslow, J. Bailey, P.M. Swiercz, D. Guthrie, D. Hawkins,
L. Yu

Associate Professors P. McHugh, G.T. Solomon, D.C. Kayes (*Chair*), L. Delpy Neirotti, A.
El Tarabishy (*Teaching*)

Assistant Professors S.N. Hill, S. Singh, N.A. Cohen

See the School of Business for programs of study leading to the degree of Bachelor of
Business Administration.

Departmental prerequisite: BAdm 1101 is prerequisite to all courses in the
Management Department; additional prerequisites are listed with the courses.

3201 **Leadership** (3) Bailey, Swiercz

Leadership in organizations and in society. Consideration of whether
leadership is a personal trait or a structured behavior and whether it is
universal across domains or situation specific. Modern and historical
examples; issues of leadership in popular contexts. Prerequisite: BAdm
3101. (Fall)

3202 **Managerial Negotiations** (3) Bailey, McHugh

Negotiation concepts, strategies, and tactics as applied to managerial situations. The
nature of interdependencies; competitive and collaborative negotiations; negotiations
involving third-party dynamics, such as mediation and arbitration. Employee relations,
including employee rights; the impact of unions and collective bargaining on management
practices. (Fall)

3203 **Applied Human Resource Management** (3) McHugh, Swiercz

The labor force and labor markets. The legal environment of human resource management. Human resource planning; employee recruiting, selection, training, development, compensation, motivation, discipline, health and safety. Prerequisite: BAdm 3101.

3204 Contemporary Topics in HRM (3) McHugh, Jensen

Contemporary practice in human resource planning, recruitment and selection, training and development, performance management, compensation and benefits, employee relations, and international human resource management. Interaction with practitioners through actual situations, case analyses, and presentations. Prerequisite: BAdm 3101.

(Spring)

4001 Women's Entrepreneurial Leadership (3) Staff

Development of the knowledge and skills needed to create a venture, which may include a social project, an arts initiative, or a new business.

4002 Product Development and Venturing (3) Solomon, Singh

Students form entrepreneur teams to develop new products. Prerequisite: Mgt 4101 or permission of instructor. (Spring)

4003 Management of the Growing Entrepreneurial Venture (3) Solomon,

Singh

Examination of the data, dilemmas, and decisions that can confront leaders of post-startup entrepreneurial ventures.

4101 Small-Business Management (3) Solomon, Winslow

Theory and practice of small business management. Focus on effective management, essentials of planning and organizing, and financial and administrative controls. Alternative

business forms; purchase of ongoing firms; franchising; new business start-ups. (Fall and spring)

4102 **Entrepreneurship** (3) Singh

Key aspects of entrepreneurial success, from idea to development to launch, including opportunity identification, feasibility analysis, industry analysis, business models, venture funding, and mentor relationships.

(Fall and spring)

4900 **Special Topics** (3) Staff

Experimental offering; new course topics and teaching methods. May be repeated once for credit.

4995 **Independent Study** (3) Staff

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

MARKETING

Professors R.F. Dyer, P.A. Rau, R.S. Achrol, L.M. Maddox, S.S. Hassan

Associate Professors M.L. Liebrezn-Himes, V. Perry (*Chair*), S. Elliott

Assistant Professors A.V. Krasnikov, S. Levy

See the School of Business for programs of study leading to the degree of Bachelor of Business Administration.

Departmental prerequisite: BAdm 3401 is prerequisite to all courses in the Marketing Department; additional prerequisites are listed with the courses.

3142 **Consumer Behavior** (3) Perry and Staff

Social, cultural, and psychological factors influencing the behavior of consumers. Models of buyer behavior, consumption patterns, market segmentation, attitude formation and change, brand loyalty, adoption of innovations, and store choice decisions. Marketing management and public policy implications of consumer research. (Fall and spring)

3143 **Marketing Research (3)** Staff

Basic methods and techniques of market research. Designing a marketing research project: research questions, secondary and syndicated data, primary data collection approaches, data analysis and report presentation. Focus group interviews, questionnaire construction, statistical software packages. Prerequisite: Stat 2112 or 2118. (Fall and spring)

4148 **Advertising (3)** Elliott, Maddox, and Staff

Planning an advertising campaign. Consumer and market information, message appeals, media selection and scheduling, measuring effectiveness. Current criticism and regulation of the advertising function. Other major marketing communication tools, including personal selling and sales promotion. Prerequisite: Mktg 3142, 3143. (Fall)

4149 **Advanced Advertising Campaigns (3)** Maddox

Participation in the National Student Advertising Competition. Research, media planning, copywriting, layout/design. Travel to competition site. Prerequisite: Mktg 4148 and permission of instructor; corequisite: Mktg 4151. (Spring)

4150 **Salesmanship and Sales Management (3)** Staff

Development of personal selling and presentation skills; examination of types of selling situations. Organization of sales department, sales planning and forecasting, quotas,

territories, performance standards, and analysis and control of distribution costs.

Prerequisite: Mktg 3142, 3143.

(Fall and spring)

4151 Marketing Communications Planning (3)

Maddox

Components of a marketing communications plan. Writing a professional proposal, plans book, executive summary, and speech. Prerequisite: Mktg 4148; corequisite: Mktg 4149. (Spring)

4152 Retailing Management (3)

Staff

A study of retailing management and strategy covering the current environment of retailing, retail market and financial analysis, store location and design, inventory management, and non-store and service retailing. Industry executive and student presentations and case analyses. (Fall)

4159 Marketing: Strategic Planning (3)

Liebrenz-Himes, and Staff

The capstone course for marketing majors. Analytical integration of material covered in previous marketing courses. Marketing strategy literature, financial dimensions of marketing decisions, and comprehensive cases. Prerequisite: Mktg 4148, 4150. (Fall and spring)

4900 Special Topics (3)

Staff

Experimental offering: new course topics and teaching methods.

4995 Independent Study (arr.)

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

MATHEMATICS

Professors H.D. Junghenn, M.M. Gupta, E.A. Robinson, F.E. Baginski, D.H. Ullman, J.

Przytycki, J. Bonin, V. Harizanov, Y. Rong (*Chair*), W. Schmitt, X. Ren

Associate Professors M. Moses, L. Abrams, H. Wu, S. Roudenko

Assistant Professors A. Shumakovitch, M. Musielak, M. Gualdani

Bachelor of Arts or Bachelor of Science with a major in mathematics—The department offers the Bachelor of Arts and Bachelor of Science with a major in mathematics through three tracks: pure mathematics, applied mathematics, and computational mathematics. Each track is designed to give students a broad background in the theory and practice of modern mathematics. The pure mathematics and applied mathematics tracks are complementary and equally rigorous, differing mainly in their emphasis. The Bachelor of Science in either track provides strong preparation for graduate study in mathematics. The Bachelor of Arts, while providing a strong mathematics background, is designed to permit a wider selection of electives to enable students to plan for careers such as teaching, medicine, or law. The computational mathematics track is designed to prepare students for careers in government and industrial settings in which modeling and computation play a large role; it is intended for students who plan to enter the job market immediately after graduation.

The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Math 1221 or 1231 and Math 1232, 2233, 2971, 2572, and 2184. Students in the pure mathematics track may substitute an additional elective, approved by the department, for Math 2572.
3. Required courses for the major—

(a) The track in pure mathematics: Math 4121, 4239, 4240, and Math 4122 or 3125; 9 credits of additional 3000/4000-level math courses for the B.A. or 15 credits of additional 3000/4000-level math courses for the B.S.

(b) The track in applied mathematics: Math 4239, 3342, 3343, 3553, and 3359; 6 credits of additional 3000/4000-level math courses for the B.A. or 12 credits of additional 3000/4000-level math courses for the B.S.

(c) The track in computational mathematics: Math 3342, 3343, 3553, 3359, and one course selected from Stat 4157 or CSci 1121, 1041, 1131, or 1011; 6 credits of additional 3000/4000-level math courses for the B.A. or 12 credits of additional 3000/4000-level math courses for the B.S.

Special Honors—To graduate with Special Honors, a student must meet the general requirements stated under University Regulations; maintain a grade-point average of at least 3.5 in courses in the major; complete 3 credits of Math 4995 in addition to the other required courses in the major; and present an oral defense of a senior thesis prepared for Math 4995.

Minor in mathematics—18 credits in mathematics courses, including Math 2184, and of which at least 9 are at the 3000 level or higher, chosen in consultation with a departmental advisor.

With permission, graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Math 1220 and 1221 each cover one-half the material of Math 1231. Because Math 1221, 1231, and 1252 are related in their subject matter, credit for only one of the

three may be applied toward a degree. For courses that indicate the placement examination as prerequisite, see <https://my.gwu.edu/mod/placement/>.

1007 Mathematics and Politics (3) Staff

A mathematical treatment of fair representation, voting systems, power, and conflict. The impossibility theorems of Balinsky and Young and of Arrow. The electoral college. The prisoner's dilemma.

1008 History of Mathematics (3) Gupta

The history of mathematics, with emphasis on its importance in the evolution of human thought. Students learn some useful mathematics from areas such as geometry, number theory, and probability and develop an appreciation of the mathematical endeavor.

1009–10 Mathematical Ideas I–II (3–3) Staff

Math 1009: Elementary mathematical models of growth and decay, scaling, chaos, and fractals. Math 1010: Elementary graph theory, scheduling, probability theory.

1051 Finite Mathematics for the Social and Management Sciences (3) Staff

Systems of linear equations, matrix algebra, linear programming, probability theory, and mathematics of finance. Prerequisite: the placement examination or a score of 560 or above on the SAT II in mathematics.

1220–21 Calculus with Precalculus I–II (3–3) Staff

An introduction to single-variable calculus (differentiation and integration of algebraic and trigonometric functions with applications), with the concepts and techniques of precalculus developed as needed. Prerequisite to Math 1220: the placement examination or a score of 560 or above on the SAT II in mathematics; Math 1220 is prerequisite to Math 1221.

1231 **Single-Variable Calculus I (3)** Staff

Limits and continuity. Differentiation and integration of algebraic and trigonometric functions with applications. Prerequisite: the placement examination or a score of 720 or above on the SAT II in mathematics.

1232 **Single-Variable Calculus II (3)** Staff

The calculus of exponential and logarithmic functions. L'Hopital's rule. Techniques of integration. Infinite series and Taylor series. Polar coordinates. Prerequisite: Math 1221 or 1231.

1252 **Calculus for the Social and Management Sciences (3)** Staff

Differential and integral calculus of functions of one variable; applications to business and economics. Prerequisite: the placement examination or a score of 560 or above on the SAT II in mathematics.

2184 **Linear Algebra I (3)** Staff

Linear equations, matrices, inverses, and determinants. Vector spaces, rank, eigenvalues, and diagonalization. Applications to geometry and ordinary differential equations. Prerequisite: Math 1221 or 1231, or 1051 and 1252, or permission of instructor.

2233 **Multivariable Calculus (3)** Staff

Partial derivatives and multiple integrals. Vector-valued functions. Topics in vector calculus, including line and surface integrals and the theorems of Gauss, Green, and Stokes. Prerequisite: Math 1232.

2572 **Introduction to Computing in Mathematics (3)** Staff

An introduction to the use of computers in modern mathematics and a primer in basic programming skills covering Maple, Matlab, and LaTeX. Prerequisite: Math 1221 or 1231.

Open to majors and to others with permission of instructor or the departmental undergraduate advisor.

2971 Introduction to Mathematical Reasoning (3) Moses and Staff

An introduction to the fundamental abstract concepts of modern mathematics as well as various proof techniques demonstrated on numerous examples taken from within discrete and continuous mathematics. Prerequisite or concurrent registration: Math 1232. Open to majors and to others with permission of instructor or the departmental undergraduate advisor.

2991 Introductory Special Topics (1 to 3) Staff

Admission by permission of instructor. May be repeated for credit.

3120 Elementary Number Theory (3) Bonin

Divisibility of integers, prime numbers, greatest common divisor, the Euclidean algorithm, congruence, the Chinese remainder theorem, number theoretic functions, Möbius inversion, Euler's phi function, and applications to cryptography and primality testing. Prerequisite: Math 2971 or permission of instructor.

3125 Linear Algebra II (3) Shumakovitch

Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms. Characteristic polynomials and the Cayley–Hamilton theorem. Similarity and Jordan canonical form. Prerequisite: Math 2971 and 2184 or permission of instructor.

3257 Introduction to Complex Variables (3) Robinson

Analytic functions and power series. Contour integration and the calculus of residues. Conformal mapping. Physical applications. Prerequisite: Math 2233, 2971, and 2184 or permission of instructor.

3342 Ordinary Differential Equations (3)

Musielak, Ren

A first course in ordinary differential equations with an emphasis on mathematical modeling: solution curves, direction fields, existence and uniqueness, approximate solutions, first and second order linear equations, linear systems, phase portraits, and Laplace transforms. Prerequisite: Math 1232 and 2184 or permission of instructor.

3343 Partial Differential Equations (3)

Baginski

A first course in partial differential equations: Fourier series and separation of variables, vibrations of a string, Sturm–Liouville problems, series solutions, Bessel’s equation, linear partial differential equations, wave and heat equations, separation of variables. Prerequisite: Math 2233 and 2184 or permission of instructor.

3359 Introduction to Mathematical Modeling (3)

Musielak

An introduction to the fundamental modeling ideas of dimensional analysis, scaling, and elementary approximations of curves and functions. Applications to development of models from science and engineering. Prerequisite: Math 2572 and 3342.

3410 Mathematics of Finance (3)

Junghenn

A mathematical development and analysis of realistic models for financial option pricing. Mathematical underpinnings and financial concepts will be developed in parallel. Prerequisite: Math 2233.

3411 Stochastic Calculus Methods in Finance (3)

Junghenn

Review of probability theory. The Brownian motion. The Ito integrals. Ito’s formula. Martingales. Stochastic differential equations. Kolmogorov’s backward equation. The generator of an Ito diffusion. Boundary value problems and the Dirichlet problem. The

Black-Scholes equation. Optimal stopping. American options. Prerequisite: Math 2184 and 3410 or permission of instructor.

3553 Introduction to Numerical Analysis (3) Gupta

Accuracy and precision. Linear systems and matrices. Direct and iterative methods for solution of linear equations. Sparse matrices. Solution of nonlinear equations. Interpolation and approximate representation of functions, splines. Prerequisite: Math 2233 or permission of instructor. Math 2572 and 2184 are recommended.

3613 Introduction to Combinatorics (3) Bonin

Introduction to combinatorial enumeration. Basic counting techniques, inclusion–exclusion principle, recurrence relations, generating functions, pigeonhole principle, bijective correspondences. Prerequisite: Math 2971 or permission of instructor.

3632 Introduction to Graph Theory (3) Ullman

Fundamental concepts, techniques, and results of graph theory. Topics include trees, connectivity, traversability, matchings, coverings, colorability, planarity, networks, and Polya enumeration. Prerequisite: Math 2971 or permission of instructor.

3710 Introduction to Mathematical Logic (3) Moses

Symbolic logic as a precise formalization of deductive thought. Logical correctness of reasoning. Formal languages, interpretations, and truth. Propositional logic and first-order quantifier logic suited to deductions encountered in mathematics. Goedel’s completeness theorem; compactness. Prerequisite: Math 2971 or permission of instructor.

3720 Axiomatic Set Theory (3) Harizanov, Moses

Cantor’s theory of sets. Russell’s paradox. Axiomatization of set theory as a framework for a contradiction-free mathematics. The Zermelo–Fraenkel axioms and the

axiom of choice. Finite, countable, and uncountable sets; ordinal and cardinal arithmetic.

The continuum hypothesis. Prerequisite: Math 2971 or permission of instructor.

3730 Computability Theory (3)

Harizanov, Moses

The unlimited register machine as a model of an idealized computer. Computable and partial computable functions; Church–Turing thesis. Kleene’s recursion theorem.

Algorithmic enumerability. Unsolvability of the halting problem and other theoretical limitations on what computers can do. Discussion of Goedel’s incompleteness theorem.

Prerequisite: Math 2971 or permission of instructor.

3740 Computational Complexity (3)

Harizanov

Automata and languages. Deterministic and nondeterministic Turing machines. Space and time complexity measures and classes. The P versus NP problem. The traveling salesman problem and other NP-complete problems. Intractability. Circuit complexity.

Introduction to probabilistic and quantum algorithms. Prerequisite: Math 2971 or permission of instructor.

3806 Introduction to Topology (3)

Przytycki, Rong

Metric spaces: completeness, compactness, continuity. Topological spaces: continuity, bases, subbases, separation axioms, compactness, local compactness, connectedness, product and quotient spaces. Prerequisite: Math 2971 or permission of instructor.

3848 Differential Geometry (3)

Robinson

Curves in space, regular surfaces, tensors, fundamental forms of a surface. Gauss–Bonnet theory, minimal surfaces. The geometry of the Gauss map. Prerequisite: Math 2233, 2971, and 2184 or permission of instructor.

4121 Introduction to Abstract Algebra I (3)

Abrams, Schmitt

Study of groups and associated concepts, including Lagrange's theorem, Cayley's theorem, the fundamental theorem of homomorphisms, and applications to counting.

Prerequisite: Math 2971 and 2184 or permission of instructor.

4122 Introduction to Abstract Algebra II (3)

Abrams

Study of rings, through maximal and prime ideals, and the study of fields, through Galois theory. Prerequisite: Math 4121 or permission of instructor.

4239 Real Analysis I (3)

Junghenn

A rigorous study of differentiation, integration, and convergence. Topics include sequences and series, continuity and differentiability of real-valued functions of a real variable, the Riemann integral, sequences of functions, and power series. Prerequisite: Math 1232 and 2971 or permission of instructor. With permission of the advisor, qualified undergraduates may substitute Math 6201 for this course.

4240 Real Analysis II (3)

Ullman

Continuation of Math 4239. Topics include: topology of \mathbb{R}^n , derivatives of functions of several variables, inverse and implicit function theorems, multiple integrals, generalized Stokes's theorem. Prerequisite: Math 2233, 2184, and 4239 or permission of instructor. With permission of the advisor, qualified undergraduates may substitute Math 6202 for this course.

4981 Seminar: Topics in Mathematics (3)

Staff

Past topics have included computational mathematics, fractals; network flows and combinatorial optimization; information theory and coding theory; dynamical systems; queuing theory. May be repeated for credit with permission. Prerequisite: Math 2233 and 2184 or permission of instructor.

4991 **Special Topics** (arr.)

Admission by permission of instructor. May be repeated for credit.

4995 **Reading and Research** (arr.)

Under the personal direction of an instructor. Limited to majors with demonstrated capability. Prior approval of instructor required. May be repeated for credit.

MECHANICAL AND AEROSPACE ENGINEERING

Professors C.A. Garriss, J.D.-Y. Lee, Y.-L. Shen, A.D. Cutler, S.M. Hsu, D.S. Dolling,

M.W. Plesniak (*Chair*), E. Balaras

Associate Professors M. Keidar, K. Sarker, Y. Leng

Assistant Professors P. Ben-Tzvi, P.M. Bardet, A.M. Wickenheiser, C. Liang, L. Zhang, M.

Leftwich, T. Lee

Adjunct Professor M.A. Imam

Professorial Lecturers G.C. Everstine, S.S. Dodbele, A. Rao, J.K. Soldner, J.H. Milgram,

J.M. Fleming, D.R. Gerk, T.M. Krafchak, R. Krishnamurthy, M.A. Busby, K. Bulusu,

T. Conway, J. Silver, M. Snyder

See the School of Engineering and Applied Science for the programs of study leading to the Bachelor of Science with a major in mechanical engineering.

1001 **Introduction to Mechanical and** Plesniak and Staff
Aerospace Engineering (1)

Careers in mechanical and aerospace engineering and the necessary academic program. Teamworking and problem-solving skills for solution of design problems.

Analytical and design problems and correlations between academic skills and the

mechanical and aerospace engineering professions. Basic aspects of engineering ethics. (Fall)

1004 **Engineering Drawing and Computer Graphics (3)** Shen

Introduction to technical drawing, including use of instruments, lettering, geometric construction, sketching, orthographic projection, section view, dimensioning, tolerancing, and pictorial drawing. Introduction to computer graphics, including topics covered in manual drawing and computer-aided drafting. (Fall and spring)

2117	Engineering Computations (3)	Staff
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Numerical methods for engineering applications. Methods for solving systems of linear equations, root finding, curve fitting, and data approximation. Numerical differentiation and integration and numerical solution of differential equations. Computer applications. Prerequisite: CSci 1121 or 1041. (Spring)

2124 **Linear Systems Analysis for Robotics (3)** Staff

Properties of linear systems. Mathematical modeling of dynamic systems. State space, state variables, and their selection. Linearization of non-linear behavior. Matrix functions. Solution of state equations in the time domain and using transformations. System stability and frequency response.

2131	Thermodynamics (3)	Staff
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Fundamentals of equilibrium thermodynamics; Zeroth, First, and Second Laws. Work, heat, internal energy, enthalpy, thermodynamic potential functions; heat transfer mechanisms, phase diagrams, equations of state and property tables, power systems, refrigeration, heat pump systems. Reversible and irreversible processes, Carnot cycle, entropy, exergy. Prerequisite: Phys 1021. (Spring)

2170 History and Impact of the U.S. Patent System (3)

Garris

Economic systems and emergence of the free market; role of the patent system in the industrial development of the United States; constitutional foundations; evolution of the U.S. patent system; landmark litigation; impact on future innovation; international aspects; the likely future of the patent system. (Spring)

3120 Methods of Engineering Experimentation (2)

Bardet

Acquisition and analysis of experimental data. Laws of modeling and simulation. Report formulation and presentation. Basic principles of measuring instruments and sensors. Fundamentals of digital data acquisition and use of computer-based data systems. Strain gages, oscilloscopes, transducers, and computerized data systems. Prerequisite: MAE 2117. (Spring)

3126 Fluid Mechanics (3)

Wickenheiser, Balaras

Fluid properties, fluid statics, integral and differential formulations of conservation of mass, momentum, and energy. Bernoulli's equation. Dimensional analysis and similitude. Inviscid flow. Viscous flow. Experimental and computational methods in fluid mechanics. Prerequisite: ApSc 2058. (Fall)

3128 Biomechanics I (3)

Zhang and Staff

Mechanical analysis of biological systems. Characterization of living tissue. Applications of statics, solid mechanics, kinematics, and elementary dynamics to the human musculoskeletal system. May be taken for graduate credit with approval of department. Prerequisite: ApSc 2057, CE 2220. (Spring)

3134 Linear System Dynamics (3)

J. Lee, Ben-Tzvi

Modeling of linear mechanical, electrical, and fluid systems as transfer functions and in state space. Linearization, discretization. Laplace and z-transforms. Natural frequencies and damping, free vibration, forced vibration. Measurement techniques, parameter estimation, and computer simulation. Time and frequency domain analysis. Prerequisite: ApSc 2113; corequisite: ApSc 2058. (Spring)

3145 Orbital Mechanics and Spacecraft Dynamics (3) T. Lee

Coordinate systems and transformations, rocket equation, two-body problem, orbit transfers, orbit perturbations, attitude dynamics and stability of symmetric spacecraft, environmental and control torques. (Fall)

3155 Aerodynamics (3) Garriss

Subsonic and supersonic aerodynamics: potential flow, lift and form drag, viscous effects, compressible flow. Prerequisite: MAE 3126. (Spring)

3162 Aerospace Structures (3) Staff

Basic structural theory of lightweight aerospace structures. Development of shear and bending moment diagrams and stresses. Analysis of typical monocoque structures. External airloads and their distribution. Mechanical properties of metal and advanced composite structures. Design of members in tension, bending or torsion, and design of webs in shear. (Spring)

3166 Materials Engineering (3) Leng

Mechanical properties, plastic deformation dislocation theory, yielding, strengthening mechanisms, microstructure and properties, heat treatment of steel, composites, amorphous materials, viscoelastic deformation, creep, fracture, fatigue, fatigue crack propagation. Prerequisite or concurrent registration: Chem 1111, Phys 1022. (Fall)

3167 Mechanics of Materials Laboratory (1)

Leng

Measurement of strains and study of failure resulting from applied forces in ductile, brittle, anisotropic, elastomeric, plastic, and composite materials. Study of tension, compression, bending, impact, and shear failures. Prerequisite or concurrent registration: MAE 3166. (Fall)

3171 Patent Law for Engineers (3)

Staff

Types of patents; international patents; inventorship; prosecution process; basic references for patents; detailed structure of a patent; patentability requirements; reexamination and reissue; litigation; infringement and invalidity; copyrights, trademarks, and trade dress. May be taken for graduate credit with approval of department. (Fall)

3184 Robotics Lab (1)

Staff

Forward and inverse kinematics modeling of robots, control design, trajectory planning, and force rendering. Corequisite: MAE 3197.

3187 Heat Transfer (3)

Keidar, Sarker

Steady- and unsteady-state heat conduction problems. Analytical and numerical solution methods. Convective heat transfer, boundary-layer approach, analogy between heat and momentum transfer. Thermal radiation; fundamental concepts and laws. Heat-exchanger design. Prerequisite: MAE 3126, 2131. (Spring)

3190 Analysis and Synthesis of Mechanisms (3)

Ben-Tzvi and Staff

Kinematics and dynamics of mechanisms. Displacements, velocities, and accelerations in linkage, cam, and gear systems by analytical, graphical, and computer methods. Synthesis of linkages to meet prescribed performance requirements. Prerequisite: ApSc 2058. (Fall)

3191 Mechanical Design (3)

Staff

Integration of knowledge of strength of materials in a design context. Stresses and deflections in engineering structures. Theories of failure. Introduction to the design of mechanical components, such as fasteners, shafts, springs. Introduction to the use of computers in mechanical engineering design. Prerequisite: CE 2220, MAE 2117. (Spring)

3192 Manufacturing Processes and Systems (3)

Shen and Staff

Introduction to manufacturing techniques for metals, polymers, ceramics, and composites. Relationships between properties of materials and techniques for processing them. Process selection, design, control, and integration. Computer-integrated manufacturing, robotics and assembly automation. Prerequisite: MAE 1004 and junior status or permission of instructor. (Fall)

3195 Computer-Aided Engineering of Mechanical Systems (3)

Staff

Presentation of the major elements of computer-aided engineering systems: interactive computer graphics, finite element analysis, and design optimization. Consideration of economics, safety, and reliability factors. Prerequisite: MAE 4193; concurrent registration: MAE 3196. (Spring)

3196 Computer-Aided Engineering Laboratory (1)

Staff

Instruction and hands-on applications of computer-aided engineering systems to the design, analysis, and optimization of mechanical engineering components and systems. Concurrent registration: MAE 3195. (Spring)

3197 Robotic Systems Design and Applications (3)

Ben-Tzvi and Staff

Modeling and analysis of robot designs. Kinematics, statics, and dynamics of linkages. Design and selection of mechanical structures, actuators,

transmissions, and sensors. Design of robotic control systems. Relevant computer hardware and software. Industrial applications and limitations of robot systems. Lab experiments. Same as ECE 4730. Prerequisite: MAE 3134. (Spring)

4129 **Biomechanics II** (3) Zhang and Staff

Mechanical analysis of physiological fluid dynamics. Application of fluid flow analysis techniques to cardiovascular, pulmonary, respiratory, and phonatory flows. Introduction to biomedical devices that manipulate physiological flows. May be taken for graduate credit with approval of department. Prerequisite: MAE 3128. (Spring)

4149 **Thermal Systems Design** (3) Garriss and Staff

Completion of a thermal systems design project that requires integration of engineering science, economics, reliability, safety, ethics, professional responsibility, and social considerations. Development and use of design methodology, optimization, feasibility considerations, detailed system descriptions, and presentation of results. Prerequisite: MAE 3187. (Fall)

4152 **Mechanical Engineering Laboratory** (2 or 3) Cutler and Staff

Project-oriented course. Simulates working environment of professional engineers. Projects are assigned in student's areas of interest; student is expected to design and assemble own experiments. Extensive use of instrumentation and computing facilities. Project proposal, progress reports, final report, and periodic oral presentations required. Prerequisite: MAE 3120. (Spring)

4157 **Aerodynamics Laboratory** (1) Cutler and Staff

Subsonic and supersonic wind tunnel experiments and simulations. (Fall)

4163 Airplane Performance (3)

Staff

Lift and drag estimation methods. Airplane performance measures, such as range and endurance, turning flight, specific excess power and acceleration, takeoff and landing performance. Longitudinal and lateral-direction static and dynamic stability. Control surface effectiveness. (Fall)

4168 Introduction to Biomaterials (3)

Staff

Fundamentals of materials science and engineering applied to artificial materials in the human body. Topics include biocompatibility, techniques to minimize corrosion or other degradation of implant materials, and the use of artificial materials in various tissues and organs. Prerequisite: Approval of department. Course not open to MAE students. (Fall)

4172 Engineering Design and the Patent System (3)

Staff

Design experience in group projects involving following precisely the teachings of a licensed patent; or avoiding infringement of a provided patent while offering a competitive alternative; or evaluating a provided patent in light of prior art or by attempting to design a competitive product. May be taken for graduate credit with approval of department.

Prerequisite: MAE 3171 and senior status. (Fall)

4182 Electromechanical Control System Design (3) Ben-Tzvi, Wickenheiser

Application of control theory to the design of electromechanical systems. Transducers, valves, and other control components. Mathematical models of open- and closed-loop electromechanical systems. Root locus and frequency response methods; application to the synthesis of feedback systems by both manual and computer-aided techniques. Prerequisite: MAE 2117, 3134.

(Fall)

4183 **Controls Lab (1)** Staff

Modeling, control design, simulation, implementation, tuning, and operation of a control system. Corequisite: MAE 4182.

4193 **Engineering Systems Design (3)** Staff

Creative engineering design, problem definition, and concept generation. Design of journal and roller element bearings, fasteners and permanent joints, and springs. Design project incorporating design selection, and optimization. Project presentation using graphical and computer resources. Prerequisite: MAE 3191. (Fall)

4194 **Mechatronics Design (3)** Ben-Tzvi

Data acquisition and digital signal processing. Sensors and their characteristics—displacement, position/velocity, force/pressure, piezoelectric. Actuators—mechanical, electrical, pneumatic, hydraulic. Modeling and simulation of dynamic systems. Mechanism design. Digital control systems. Microprocessors, digital logic/circuits, motor drives. Lab experiments. Prerequisite: MAE 4182. (Spring)

4195 **Mechatronics Lab (1)** Ben-Tzvi

Corequisite: MAE 4194.

4198 **Research (1 to 3)** Staff

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

4199 **Student Design Project (1 to 3)** Staff

Special student projects involving extensive design of various mechanical engineering systems. Examples include the solar car, mini-Baja, or other design competitions that

typically are national in scope. May be taken for graduate credit by graduate students. (As arranged)

MEDIA AND PUBLIC AFFAIRS

Professors S.V. Roberts, R.M. Entman, L. Huebner, F. Sesno (*Director*), S.L. Livingston, S. Waisbord

Associate Professors J.E. Steele, L.S. Harvey, A.L. May III, P.F. Phalen, S. Aday, R. Russell, K.A. Gross, N. Seavey (*Research*), M. Hindman

Assistant Professors J.M. Shanahan, J. Osder, C.S. Bailard, N. Usher, D.A. Karpf, W.L. Youmans

The School of Media and Public Affairs, part of Columbian College of Arts and Sciences, offers programs of study leading to the Bachelor of Arts with majors in journalism and mass communication and in political communication. Entering freshmen may be admitted to majors within SMPA through a competitive application process as specified in application materials distributed by the Office of Admissions.

In addition, a limited number of students will be admitted through a competitive application process that begins after the student is accepted to the University. Students are encouraged to apply during the first semester of their sophomore year; applications are not accepted from students with fewer than 30 or more than 75 credit hours. Minimum requirements for admission include a minimum GPA of 3.0, though achievement of the minimum GPA does not guarantee admission. Once admitted to the University, students desiring to enter an SMPA major face a highly selective process. Contact SMPA for specific information and applications; program application requirements vary and in some

cases include achieving specific grades in certain courses and completion of an essay.

Programs are listed below with their course offerings.

All students, both those admitted directly into SMPA and those applying after acceptance to GW, must achieve specified grades in some courses. Check with SMPA for particular grade requirements and course sequencing.

Bachelor of Arts with a major in journalism and mass communication—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in related areas—AmSt 2010 and 2011 or Hist 1310–11; PSc 1002; Stat 1053; one course chosen from Econ 1011 or PSc 1001 or 1003.
3. The SMPA core—SMPA 2151, 2101, 2102, 2110 (which requires a minimum grade of *B* to apply for or remain in the major), 2112, and 4199.
4. Required courses in the major—SMPA 2111 and either 2173 or 2177; four courses chosen from SMPA 3230–47, 3193, and 3197; four courses chosen from SMPA 2120, 3428, 3459–80, 3195, 3196, and 4198.

Bachelor of Arts with a major in political communication—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in related areas—AmSt 2010 and 2011 or Hist 1310–11; PSc 1002 and either 1001 or 1003; Stat 1053.
3. The SMPA core—SMPA 2151, 2101, 2102 (which requires a minimum grade of *C* to remain in the major), 2110, 2112, and 4199.

4. Required courses in the major—SMPA 2120 or PSc 2220; two upper-division PSc courses; seven courses chosen from SMPA 3428, 3241, 3245, 3350–58, 3459–72, 3194, 3196, 3197, and 4198.

Combined Bachelor of Arts in an SMPA major and Master of Arts in media and public affairs—Interested students should consult their advisor and the director of graduate studies and apply to the dual degree program during the second semester of their junior year.

Combined Bachelor of Arts in an SMPA major and Master of Professional Studies in the field of political management—Interested students should consult their advisor and apply to the dual degree program during the second semester of their junior year.

Special Honors in journalism and mass communication—Students with a 3.5 GPA in all courses completed at GW and in all courses required for the major may apply for Special Honors in journalism and mass communication. Students intending to apply must consult with their advisor at the start of the senior year. Application must be made by the mid-point of the student's final semester (October 15 or March 15) and must include a letter of application and a portfolio of published or broadcast work. The work will be evaluated by the journalism and mass communication faculty on the basis of professional standards as outlined by the department. Students interested in pursuing Special Honors through writing a research thesis should consult their advisor.

Special Honors in political communication—Students with a 3.7 GPA in all courses completed at GW and in all courses required for the major may declare for Special Honors in political communication at the beginning of the senior year. Students take SMPA 4199 in the first semester of the senior year and SMPA 4198 in the second semester. To achieve Special Honors, the student must maintain the required GPA and present a successful oral

defense of a research paper prepared for the Honors Research Seminar before a committee that includes the seminar instructor and two other faculty members nominated by the student and approved by the seminar instructor.

Minor in journalism and mass communication—Required: 18 credit hours, including SMPA 1050 and 2110; 6 credits chosen from 3230–47, 3193, 3197; and 6 credits from 2173, 2177, 3469–80, 3195. Students are limited to 3 credits of SMPA 3197 toward the minor.

1050 **Media in a Free Society (3)** Aday, Phalen, and Staff

The role of mass communication in democratic political systems: informational requirements of democracy, sources of political information and the role of news media and other channels in creating and disseminating it; issues relating to propaganda and public information; and the interaction between information flows and democratic political culture. Not open to SMPA majors.

2101 **Journalism and Mass Communication** Steele, Waisbord, Usher
Theory and Practice (3)

An overview of journalism and mass communication in the United States. Organizations and institutions of print and electronic news media; the social context of journalism; how news is constructed; and intellectual underpinnings of occupational ideals and professional practices that guide journalism. Open only to SMPA majors.

2102 **Introduction to Political Communication (3)** Entman, Gross, Livingston

Basic concepts and theories of political communication; development of a framework for analyzing political communication; applications in the United States, other countries, and the international system. Open only to SMPA majors. Prerequisite: PSc 1002.

2110 Introduction to News Writing and Reporting (3) Staff

Fundamentals of news reporting and writing, with emphasis on the print media. News judgment, information gathering skills, and crafting news and feature stories. Regular in-class and outside reporting and writing exercises. Directly admitted freshmen may enroll in their second semester; all other freshmen need departmental permission. Laboratory fee.

2111 Advanced News Reporting Workshop (4) May

Reporting, writing, and computer skills for covering beats and developing in-depth news stories. Techniques in researching, observing, and interviewing to frame stories of public interest; outside and in-class reporting and writing assignments. Restricted to Journalism and Mass Communication majors or permission of instructor required.

Prerequisite: SMPA 2110. Laboratory fee.

2112 Introduction to Digital Media Production (3) Osder and Staff

Basic introduction to digital media production, including web design and video shooting/editing, with emphasis on use in journalism and political communication.

Laboratory fee.

2120 Public Opinion (3) Gross, Bailard

Key aspects of the literature on public opinion, with emphasis on the role of media in opinion formation and change. Topics include the meaning of public opinion in a democratic society, a review of methods used to measure opinions, and media effects on opinion.

2151 Research Methods (3) Gross, Hindman, and Staff

Processes of inquiry within mediated communication. The concepts of framing research questions, conducting literature reviews, developing a research design, and

interpreting results of cultural and social science research within a societal framework.

Prerequisite: Stat 1053.

2173 **Media Law (3)** Youmans and Staff

Freedom of the press, censorship, legislative controls, copyright, laws of libel and privacy, and laws relating to the news business, privilege, and fair comment.

2177 **Media History (3)** Staff

American media from colonial times to the present, set against a backdrop of ongoing political, social, and economic developments. The development of press, radio, television, cable, satellite, and the Internet; government regulation and media relations; journalistic rights and responsibilities.

3193 **Selected Topics in Journalism and** Staff

Mass Communication Skills (3 or 4)

Topics announced in Schedule of Classes. May be repeated for credit if the topic differs.

3194 **Selected Topics in Political Communication (3 or 4)** Staff

Topic announced in the Schedule of Classes. May be repeated if the topic differs, but only two selected topics may count for credit toward the political communication major.

3195 **Selected Topics in Journalism and Mass Communication (3 or 4)** Staff

Topic announced in the Schedule of Classes. May be repeated for credit if the topic differs.

3196 **Independent Study (1 to 3)** Staff

Students pursue a program of directed reading, research, and writing under the direction of a faculty advisor. Limited to seniors.

3197 **Internship** (1 to 3) Staff

Students spend at least five hours per week per credit with an approved news organization, agency, or office under the general guidance of a faculty advisor. Guidelines are available in the SMPA office and online. May be taken *P/NP* only. Restricted to SMPA majors and minors in the junior and senior year. May be repeated for up to 6 credits.

3230 **Reporting in the Digital Age** (3) May and Staff

Understanding the emerging tools and developing the technological skills needed to analyze data for news. Students learn to find reliable information through social media and other online tools, use spreadsheets as a reporting tool, and download data for analysis, to create graphics, and to report and write stories based on the analysis. Prerequisite: SMPA 2110. Laboratory fee.

3232 **Online Journalism Workshop** (4) Osder, Shanahan

Capstone production experience for SMPA majors. Provides advanced journalism and multimedia production skills needed to produce and report for a news website. Prerequisite: SMPA 2110, 2112. Laboratory fee.

3233 **Photojournalism** (3) Staff

Elements of effective news and feature photos, including study and evaluation of slides taken by students. Picture selection, cropping, captions. Student costs include film and developing. Laboratory fee.

3234 **Publication Design** (3) Staff

Design, editing, layout, and photo selection for newspapers and magazines. Selecting and editing stories; writing headlines and photo captions; sizing and cropping graphic materials; laying out pages. Ethics of editing. Student costs include film and developing.

3235 Broadcast News Writing (3)

Russell and Staff

Introduction to writing television news scripts based on actual events. Using workshop techniques, scripts are evaluated for content, structure, and use of words, pictures, and sound. Extensive writing and rewriting using streaming video from professional newscasts.

Prerequisite: SMPA 2110.

3236 Broadcast News Reporting (3)

Russell

Advanced techniques in television news reporting and editing. Students produce, shoot, and edit news packages by teaming up to report in the field. Prerequisite: SMPA

2110, 2112.

3237 Broadcast News Studio Production (3)

Russell

Hands-on workshop designed to give simulated TV industry experience. Students work together to produce and direct a simulated broadcast news program. Recommended prerequisite: SMPA 3235 or 3236. Laboratory fee.

3238 Television Magazine (3)

Staff

Advanced techniques in writing, reporting, producing, and editing television news magazine packages. Prerequisite: SMPA 3236. Laboratory fee.

3239 Television News Workshop (4)

Russell

Capstone production experience for SMPA majors. Students report, produce, direct, and edit GW student news broadcast. Prerequisite: SMPA 3237. Laboratory fee.

3240 Washington Reporting (3)

May, Shanahan

Examination of reporting and writing techniques employed in news coverage of the national government, with an emphasis on serving a regional readership or audience. Using Washington as a laboratory, students focus on contemporary issues and news makers in the legislative and executive branches of government. Prerequisite: SMPA 2110.

3241 **Campaign Reporting** (3) May

Development of news gathering and writing skills needed for the coverage of political campaigns. Using in-class exercises and outside assignments, students acquire reporting and writing proficiency to illuminate how campaigns work and how politics affects the lives of citizens. Prerequisite: SMPA 2110.

3242 **Investigative Reporting** (3) Staff

Hands-on intensive training in reporting and writing in-depth enterprise news stories that expose hidden problems or wrong-doing. Prerequisite: SMPA 2110.

3243 **Feature Writing** (3) Roberts

Development and writing of a wide range of feature articles, including interviews, profiles, op-ed columns, and personal memoirs. Weekly writing assignments and practical experience, including marketing work to publications. Prerequisite: SMPA 2110.

3244 **Narrative Journalism** (3) Steele and Staff

The narrative or story-telling tradition in journalism. Students experiment with narrative techniques in a series of written exercises and a final project. Enrollment limited to 15 students with preference given to upper-class SMPA majors and graduate students. Prerequisite: SMPA 2110.

3245 **Editorial and Persuasive Writing** (3) Keller

Techniques of editorial and column writing; editorial page and public affairs programming; function of commentary in a free press. Prerequisite: SMPA 2110.

3246 **Specialized Reporting** (3) Staff

Advanced reporting in specialized fields, such as business, science, medicine. Topics and instructors vary each semester. Prerequisite: SMPA 2110.

3247 **Documentary Production** (4) Staff

Advanced techniques in writing, researching, producing, and editing long-form documentaries. Prerequisite: SMPA 2112 and 3479 or permission of instructor.

3350 **Public Diplomacy** (3) Staff

The theory and practice of public diplomacy: informing, influencing, and establishing dialogue with international publics and institutions. A conceptual and historical examination of public diplomacy, current practices, and contemporary issues, including international information dissemination, educational and cultural exchange, and international broadcasting.

3351 **Public Affairs and Government Information** (3) Staff

Aspects of information and public affairs functions of government agencies at all levels. Role of the information specialist. Writing and editing for government publications.

3352 **Principles of Public Relations** (3) Staff

Principles, problems, ethics, and law of public relations for government, private concerns, educational and other public institutions.

3353 **Strategic Political Communication** (3) Karpf

Origins of strategic approaches to political communication; techniques. Use of strategic communication by individuals, groups, organizations, and governments in both

domestic politics and policymaking and in the international system. Prerequisite: SMPA 2102 or permission of instructor.

3354 **Political Campaign Communication (3)** Staff

Communication aspects of political campaigns for candidates and ballot issues. Examination of techniques and channels of communication, role of communication in campaign strategy, ethics and implications of campaign decision making.

3355 **Campaign Advertising (3)** Staff

Introduction to the theory and practice of campaign advertising. Emphasis on televised political campaign spots, but a range of campaign advertising media are included: radio, direct mail, and the Internet. Prerequisite: SMPA 2112.

3356 **Political Debate (3)** Staff

Theory and practice of political debate. The campaign context, candidate strategies, debate issues, and debates and voter behavior. Participation in classroom debates.

3357 **Political Speech Writing (3)** Huebner

Theory and practice of public speaking in the context of mediated political communication. Students analyze, write, and give speeches.

3358 **Strategic Practicum (3)** Karpf

Working in small groups, students research and develop full-scale plans for hypothetical, reality-based, strategic communication campaigns that test and apply theoretical advances in the field. Prerequisite: SMPA 3353.

3428 **Media, Politics, and Government (3)** Roberts

Exploration of the role played by communication, principally through the mass media, in the conduct of government and the making of public policy. Same as PSc 2228.

3459 **Language and Politics** (3) Staff

Connections between language and the political world. Theory and practice of language in politics and the impact on the creation and consumption of politics.

3460 **Race, Media, and Politics** (3) Gross, Entman

Examination of the place of race in American society and politics, with attention to the role of media reporting in helping to shape understanding of race and racial matters, public opinion about race, and race and electoral politics.

3461 **Campaigns and Elections** (3) Gross, Aday

The role of the news media in campaigns and elections. Offered in even-numbered years.

3463 **Media Bias, Power, and Democracy** (3) Entman

Exploration of empirical and theoretical understanding of media bias, its effects on power, and implications for democracy.

3469 **International Communication** (3) Youmans

Major international news-gathering and broadcasting organizations, international communications policy forums, organizations and treaties, spectrum allocation criteria, communications technology, and trade in communication.

3470 **Comparative Media Systems** (3) Waisbord

In-depth study of the developmental, regulatory, political, economic, and cultural dimensions of selected foreign communication systems.

3471 **Media in the Developing World** (3) Steele, Waisbord

Contemporary views of media roles in developing nations. The role of the press and electronic media in economic, social, and national development, including media as agents of modernization, development journalism, and post-colonial responses to Western “cultural imperialism.” Media and Islam; role of the Internet; and theories of media and globalization.

3472 **Media and Foreign Policy (3)**

Livingston

The emerging role of news media in international affairs and diplomacy, particularly as it relates to U.S. foreign policy. Globalization of news media advances in instantaneous communication technologies; consequences for international diplomacy.

3474 **Electronic Media Policy (3)**

Staff

Legal, technical, political, economic, and social aspects of radio, television, and cable and related delivery systems. Structure and operation of the FCC and other agencies; the role of Congress and the courts. Spectrum allocation, behavioral regulation, the trend to deregulate political influence, and current policy issues.

3475 **Media Management (3)**

Staff

Decision making, strategic planning, and daily operations of all types of media organizations. Sales strategies, promotion, and research.

3476 **Changing Media Technology (3)**

Harvey

Current and likely future trends in electronic media, with emphasis on radio, television, and cable, including developments in technology, programming, and public policy and their cultural implications.

3479 **Art and Genre of Documentary (3)**

Sesno

Origins, genres, and future of documentary film. Power, reach, and conceptual frameworks of documentary filmmaking.

3480 **Convergence and the Future of Journalism** (3) Shanahan

Reasons behind the decline of traditional newspaper and broadcast journalism; the impact of the web and other digital tools on traditional journalism values.

4198 **Special Honors Research Seminar** (3) Staff

Open only to special honors candidates in political communication in the senior year.

Prerequisite: SMPA 4199 and departmental approval.

4199 **Senior Seminar** (3) Staff

Capstone course limited to SMPA majors.

MUSIC

Professors R.J. Guenther, L. Youens

Associate Professors K. Ahlquist, B. Fritz, D. Boyce (*Chair*)

Assistant Professors R. Baker, E. Montague

Adjunct Professors K. Lornell, M. Peris (*Piano*), J.D. Levy (*Jazz*), J. Albertson (*Guitar*),

F.B. Conlon (*Piano*), T. Konstantinov (*Piano*), R. Birch (*Trumpet*), M. Findley

(*Violin*), P. Fraize (*Jazz Performance/Saxophone*), B. Dahlman (*Piano*), A. Rojas

(*Guitar*), S. Hilmy (*Electronic Studio*)

Adjunct Instructor G. Becker (*Choral*)

Professorial Lecturers E. Guenther (*Pipe Organ*), E. Field (*Violin*), C.J. Pickar, L. Barnet

(*Cello*), J. Krash (*Literature*), N. D'Alimonte (*Orchestra*), R. Ocampo (*Voice*), J.

Gascho (*Harpsichord*)

Lecturers B.R. Seidman (*Harp*), S. Wellman (*Voice*), S.M. Fearing (*French Horn*), M. Von Villas (*Opera*), J.C. Connell (*Percussion*), L. Gilliam (*Recorder*), A. Reiff (*Voice*), S. Stang (*Flute*), L. Ferguson (*Clarinet*), M. Scarlett (*Voice*), G. Corella (*Tuba*), D. Jones (*Clarinet*), D. Sciannella (*Trombone*), E. Drennen (*Jazz Violin*), C. Stabile-Libelo (*Oboe*), A. Lucini (*Latin Percussion*), J. Koczela (*Bass*), E. Dirksen (*Bassoon*), U. Wassertzug (*Viola*), A. Crockett (*Voice*), H. Burney (*Jazz Bass*), T. Wilson (*Jazz Trumpet*)

Bachelor of Arts with a major in music—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Mus 1101, 1102, 1051 (or equivalent). Students must achieve grades of *C* or better in Mus 1101 and 1051 to declare the music major.
3. Two courses (6–8 credits) in one language other than English, beginning at the level at which the student places.
4. Required courses in the major—Mus 2101, 2102, 2105, 2106, 3126, 3127, 3139, 4198; 4 credits of private performance study courses; 2 credits of music ensemble courses. In addition, 12 credits of music electives are required, at least 3 of which must be from a course numbered 2662 and above. The distribution of these electives is as follows: history and literature (Mus 2109, 2110, 2121, 2122, 2111, 3175), 3 credits; theory and composition (Mus 2174, 2134, 2135, 2137, 2661–62, 3174, 4184), 3 credits; free electives in music, 6 credits. Because of the various options available in the B.A. program in music, students should consult with music faculty advisors at the earliest opportunity. All majors are expected to attend departmental lectures, master classes, and concerts, as appropriate.

5. Music majors are required to complete an approved independent project in their senior year, concurrently with registration in Mus 4198. This project consists of a total of 2 to 6 credits, accumulated through registration for Mus 4199 and/or any upper-division private performance study course.

Special Honors in Music—To receive Special Honors in music, a student must meet the requirements stated under University Regulations and maintain a 3.5 grade-point average in music courses and at least a 3.0 average overall. The student must complete the required senior independent project for at least 3 credits with a minimum grade of A–.

Minor in music—21 credit hours of music courses, consisting of Mus 1101, 1102, 1051; 3 credits chosen from Mus 2106, 3126, 3127; 3 credits chosen from Mus 2105–2122, 3126, 3127, 3175; 3 credits of private performance study or ensemble; and 6 credits of music electives, two of which must be upper-division. All minors are expected to attend departmental lectures, master classes, and concerts, as appropriate.

Minor in jazz studies—23 credit hours of music courses, consisting of Mus 1101, 1102, 1108, 2173, 1051, 2174, 2661; 4 hours of jazz performance techniques (Mus 1571–72 or 2072); and 2 hours of ensemble participation (Mus 1061 or 1071). All minors are expected to attend departmental lectures, master classes, and concerts, as appropriate.

MUSIC THEORY, COMPOSITION, HISTORY, AND LITERATURE

1101 Elements of Music Theory (2)

Boyce, Montague

Notation, scales, keys, intervals, terms, rhythms, and chord structure and progression. Introduction to music literature, with emphasis on rudimentary aural analysis. (Fall and spring)

1102 Comprehensive Musicianship I (3)

Boyce

Aural and keyboard skills development through dictation, sight singing, and performance and improvisation at the keyboard. Prerequisite: Mus 1101, 1051. (Fall and spring)

1103 **Music in the Western World (3)** Krash and Staff

Introductory history of musical styles, related to listening; study of music materials and media. Not open to music majors. (Fall and spring)

1104 **Topics in Music (3)** Staff

A rotating set of classes; topics may include: American music, a composer, the opera, and musical life in Washington, D.C. (Fall and spring)

1105 **Introduction to Musical Thought and Practice (3)** Staff

Introduction to concepts, methods, and practices that guide the study and performance of music. Old and new paradigms of musical thought are subject to discussion and critical investigation.

1107 **Music of the World (3)** Ahlquist

Introduction to music in culture through comparative study of music from a variety of cultures worldwide.

1108 **History of Jazz (3)** Lornell

Introduction to the styles, composers, and performers of jazz music from its origins to the present. (Spring)

2101 **Harmony (3)** Boyce, Montague

Study of tonal harmonic practice from Baroque, Classical, Romantic, and 20th-century repertoires. Concurrent registration in the weekly keyboard lab is required. Prerequisite: Mus 1102. (Spring)

2102 Comprehensive Musicianship II (3)

Boyce, Montague

Aural and keyboard skills development through dictation, sight singing, and performance and improvisation at the keyboard. Prerequisite: Mus 2101.

(Fall and spring)

2105 Introduction to Ethnomusicology (3)

Ahlquist, Lornell

Models of understanding music as a cultural endeavor. Application and critique of models in the design and execution of student independent field research. Prerequisite: Mus 1101 or Anth 1002 or 1004 or permission of instructor. Same as Anth 2505. (Spring)

2106 Music History III: 20th-Century Art Traditions (3)

Staff

Western musical traditions and styles since Romanticism and approaches to music as art in contemporary society. Prerequisite: Mus 1101. (Fall)

2109 Orchestra Literature (3)

Guenther

History and styles of orchestra literature, analysis of representative works.

Prerequisite: Mus 2101 or permission of instructor.

2110 Chamber Music Literature (3)

Youens

History and styles of chamber music literature, analysis of representative works.

Prerequisite: Mus 2101 or permission of instructor.

2111 Keyboard Music Literature (3)

Staff

History and styles of keyboard literature from the 16th century to the present.

Prerequisite: Mus 2101 or equivalent.

2121 Opera (3)

Youens

History and styles of opera, analysis of representative works. Prerequisite: Mus 2101 or equivalent. (Fall)

2122 **Music in the United States (3)** Ahlquist

History of music and musical life in the United States, emphasizing relationships among traditions of diverse origin. Prerequisite: Mus 1101 or permission of instructor.

2123 **Musical Cultures of Black Americans (3)** Lornell

Musical genres and styles developed by African Americans since Reconstruction in their historical and cultural contexts. Emphasis on black musical contributions to the cultural life of Washington, D.C.

2134 **Composition (3)** Boyce

Introduction to 21st-century compositional practice; concepts of post-tonal analysis; emphasis on style studies and original student works. May be repeated for credit. Prerequisite: Mus 2101.

2135 **Counterpoint (3)** Staff

Study and practice of 16th-century contrapuntal techniques. Prerequisite: Mus 1102.

2137 **Orchestration (3)** Staff

Instrumental scoring. Prerequisite: Mus 2101.

2140 **Pedagogy (3)** Staff

Principles, materials, and methods of teaching in selected areas. Prerequisite: permission of instructor.

2173 **Comprehensive Musicianship for Jazz (2)** Levy

Aural and keyboard skills development through dictation, sight singing, and performance and improvisation at the keyboard, with emphasis given to skills associated with jazz performance. Prerequisite: Mus 1102. (Fall)

2174 **Introduction to Jazz Harmony (3)** Fraize

Analysis and composition of tunes in jazz/pop styles. Study of rhythmic characteristics, voice-leading, and chord/scale relationships within a jazz context.

Prerequisite: Mus 1102. (Spring)

2661–62 Electronic and Computer Music (3–3)

Hilmy

Fundamental electronic and computer music concepts. Analog and digital sound synthesis techniques and theory, MIDI, studio recording techniques, signal processing, properties of sound, acoustics and psycho-acoustics, history and aesthetics. Laboratory fee.

Mus 2661 is prerequisite to Mus 2662.

3126 Music History I: Antiquity through Early Baroque (3)

Youens

The development of Western European music from its earliest traceable roots to the end of the early, experimental Baroque period. Prerequisite: Mus 1102 and sophomore standing. (Spring)

3127 Music History II: The Tonal Era (3)

Ahlquist

Styles, structures, social foundations and aesthetic change in European music of the late 17th through the late 19th centuries. Prerequisite: Mus 1102.

3139 Form and Analysis (3)

Montague

Analysis of musical forms in representative musical literature. Prerequisite: Mus 2101 or equivalent. (Fall)

3174 Topics in Music Theory and Composition (3)

Staff

A seminar on variable topics in the discipline of music theory, analysis, and composition. Topics may include analysis of post-tonal music, advanced jazz arranging, analysis of 14th-century vocal music, developments in extended instrumental techniques since 1950. Prerequisites depend on the topic; consult the department.

3175 **Topics in Music History and Literature (3)** Staff

A seminar on variable topics in music history and literature in all traditions and styles. Topics may include German musical Romanticism, introduction to critical musicology, the music of Josquin des Prez, and vernacular music in Washington, D.C. Prerequisites depend on the topic; consult the department.

4184 **Advanced Composition (3)** Boyce

Private instruction in composition in tutorial format. Prerequisite: Mus 2134.

4198 **Senior Seminar (1)** Staff

Restricted to music majors in their final spring semester. Presentations of required senior projects in process; readings and discussion to place the projects in a broader musical and intellectual context. Corequisite: Mus 4199 or any upper-division private performance study course.

4199 **Independent Research (1 to 4)** Staff

Under the guidance of an assigned instructor. May be repeated for credit. Majors in their senior year take Mus 4198 as a corequisite.

PERFORMANCE STUDY

Performance study courses are offered both fall and spring, and may be repeated for credit.

Music majors and minors, Presidential Arts Scholarship students, and other students with skills or potential appropriate to the department's select ensembles are eligible for private lessons. Eligibility and placement for students new to private performance study are determined at a placement fair held at the beginning of each semester. For courses numbered in the 1500s, students may not register in the same semester for both the 1- and 2-credit

course in the same instrument or in voice. Mus 1051–1095 and 1151 do not include individual lessons and do not require a supplementary fee. All other performance study courses include individual lessons and require a supplementary fee. Supplementary fees for private performance courses are nonrefundable after the first two weeks of the fall and spring semesters; consult the Music Department for details. The supplementary fee is waived during the fall and spring semesters for full-time music majors and minors and for music Presidential Scholars in the Arts.

Required practice: a minimum of three hours a week for 1-credit courses and six hours a week for 2-credit courses.

1051–52 **Class Piano for Music Majors and Minors (1–1)** Staff

Study of the rudiments of musical notation and piano playing in a small classroom setting. Open to majors and minors who need basic keyboard facility.

1061 **Instrumental Ensemble (1)** Staff

Chamber ensemble groups are approved by audition. Section numbers are .11 guitar ensemble, .12 percussion ensemble, .13 jazz combo, .14 keyboard ensemble, .15 string ensemble, .16 woodwind ensemble, .17 brass ensemble, .18 Baroque ensemble, .19 Latin band, .20 blues band.

1071 **Jazz Band (1)** Levy

Preparation and performance of classic and contemporary “big band” literature.

Prerequisite: audition before director.

1081 **University Orchestra (1)** D’Alimonte

Preparation and performance of orchestral literature. Prerequisite: audition before director.

1083 **University Band** (1) Fritz, Birch

Section .10 is University Symphonic Band; Section .11 is University Wind Ensemble.

1093 **University Singers/Chamber Choir** (1) Becker

Preparation and performance of choral literature. Prerequisite: audition before director. Section .10 is University Singers; Section .11 is Chamber Choir.

1095 **Vocal Theater Workshop** (1) Von Villas, Conlon

Development of body awareness for the stage, acting improvisations, and character development. Scenes chosen from the opera, operetta, and musical theater repertoire. Musical coaching, use of makeup, and audition preparation.

1151 **Conducting** (3) Fritz

Technique of conducting, score reading, rehearsal procedures, analysis, and interpretation of selected musical literature; practice in conducting. Prerequisite: Mus 2101. (Fall, even years)

1511–12 **Piano** (1–2) Staff

1513–14 **Voice** (1–2) Staff

1515–16 **Pipe Organ** (1–2) E. Guenther

1517–18 **Classical Guitar** (1–2) Rojas

1519–20 **Violin** (1–2) Field, Findley

1521–22 **Viola** (1–2) Wassertzug

1523–24 **Cello** (1–2) Barnet

1525–26 **Bass** (1–2) Koczela, Burney

1527–28	Flute (1–2)	Stang
1529–30	Recorder (1–2)	Gilliam
1531–32	Oboe (1–2)	Stabile-Libelo
1533–34	Clarinet (1–2)	Ferguson, Jones
1535–36	Saxophone (1–2)	Fraize, Jones
1537–38	Bassoon (1–2)	Dirksen
1539–40	French Horn (1–2)	Fearing
1541–42	Trumpet (1–2)	Birch, Wilson
1543–44	Trombone (1–2)	Sciannella
1545–46	Tuba (1–2)	Corella
1547–48	Harp (1–2)	Seidman
1549–50	Percussion (1–2)	Connell, Lucini
1557–58	Harpsichord (1–2)	Gascho
1571–72	Jazz Performance Techniques (1–2)	Staff

Section numbers are .10 piano, .11 bass, .12 percussion, .13 guitar, .14 brass, .15 woodwind.

Departmental prerequisite: Private performance courses listed below are open by examination.

Required practice: a minimum of eight hours a week for 2-credit courses.

2012	Piano (2)	Staff
2014	Voice (2)	Staff
2016	Pipe Organ (2)	E. Guenther
2018	Classical Guitar (2)	Rojas

2020	Violin (2)	Field, Findley, Wassertzug
2022	Viola (2)	Wassertzug
2024	Cello (2)	Barnet
2026	Bass (2)	Koczela
2028	Flute (2)	Stang
2030	Recorder (2)	Gilliam
2032	Oboe (2)	Stabile-Libelo
2034	Clarinet (2)	Ferguson, Jones
2036	Saxophone (2)	Fraize, Jones
2038	Bassoon (2)	Dirksen
2040	French Horn (2)	Fearing
2042	Trumpet (2)	Birch
2044	Trombone (2)	Sciannella
2046	Tuba (2)	Corella
2048	Harp (2)	Seidman
2050	Percussion (2)	Edgar, Lucini, Connell
2058	Harpsichord (2)	Gascho
2072	Jazz Performance Techniques (2)	Staff
2318	Orchestral Instrument (2)	Staff
4085	Advanced Performance Study (3)	Staff

Private study in vocal or instrumental performance. Public performance and a minimum of 12 hours of practice per week are required. Prerequisite: audition before a faculty committee.

NAVAL SCIENCE

Naval Reserve Officers Training Corps Program

The Naval Reserve Officers Training Corps (NROTC) offers young men and women the opportunity to qualify for a full scholarship and a commission in the Navy or Marine Corps. NROTC midshipmen are required to complete the naval science courses and attend weekly professional seminars. During the summer, NROTC midshipmen participate in active duty at sea or shore-based training cruises for approximately four weeks. Upon receiving the baccalaureate and completing the NROTC program, qualified midshipmen are commissioned as ensigns in the U.S. Navy or second lieutenants in the Marine Corps. Commissioned naval officers go on to training in various warfare specialties and serve as surface or submarine officers, naval aviators, or SEALs. Marine Corps officers attend basic school in Quantico, Virginia, and serve in fields such as infantry, artillery, and aviation. Staff positions (intelligence, law, medicine) are not normally offered through NROTC. Students may join the NROTC through any one of the following programs.

Four-Year Scholarship Program—Students enter the NROTC Four-Year Scholarship Program through national competition and are appointed midshipmen in the Naval Reserve. While enrolled, a four-year-scholarship student receives government-provided tuition, fees, \$350 per semester for books, uniforms, and an allowance of up to \$400 per month. Upon graduation, students are commissioned with a minimum four-year active duty service obligation. Scholarship Program students must include in their degree program courses in English, calculus, cultural awareness, physics, national security policy, and naval science and participate in three summer training periods of approximately four weeks each.

Two-Year Scholarship Program—Selection for this program is made through national competition, based on the student's academic record, physical qualifications, and an interview. Application should be made by the middle of the fall semester of the student's sophomore year. Selected applicants attend six weeks of instruction at the Naval Science Institute (NSI) at Newport, Rhode Island, during the summer before their third academic year. At NSI, students take courses in naval science, physical fitness, and drill, similar to those required of four-year NROTC students during their freshman and sophomore years. Successful completion of the NSI program qualifies the two-year applicants for appointment as midshipmen in the Naval Reserve and enrollment in the NROTC Scholarship Program. Upon acceptance of this appointment, students receive all the benefits and assume all the obligations of midshipmen in the Four-Year Scholarship Program.

Entering freshmen and transfer students who are awarded NROTC scholarships and plan to live on campus may also be eligible for GW Residence Hall Awards from the University. NROTC scholars with prior experience in the Navy are eligible for awards covering the nominal charges for on-campus housing and meals. NROTC scholars who are new to the Navy and are majoring in mathematics, chemistry, physics, or a program in the School of Engineering and Applied Science may receive up to \$4,000 to be applied toward the costs of on-campus housing and meals. Further information on these awards is available from the University Office of Admissions.

Four-Year College Program—Students are enrolled in a non-scholarship Four-Year College Program upon acceptance by the Department of Naval Science. Uniforms are provided, and during their junior and senior years, students receive up to \$400 per month. Students must include in their degree program courses in college algebra, science, and naval

science and must attend the four-week at-sea training period between junior and senior year. Upon commissioning, College Program students serve a minimum of four years' active duty. Midshipmen who complete one term as College Program students, have a satisfactory academic record, and are physically qualified may compete for a scholarship awarded by the Chief of Naval Education and Training. If awarded, the scholarship will be for the remainder of the student's undergraduate enrollment, up to a maximum of three and a half years; service requirements and benefits are the same as for the scholarship programs.

Two-Year College Program—Application should be made by the middle of the fall semester of the student's second year. Selections are made through the Chief of Naval Education and Training, based on the student's academic record, physical qualifications, and an interview. Those students selected will attend the NSI and upon successful completion may enroll in the program. The benefits and obligations are the same as for the Four-Year College Program.

Requirements for all candidates—Qualifications for acceptable candidates for the Scholarship Program or the College Program include U.S. citizenship, fulfillment of physical requirements, and willingness to participate in required summer training periods and to accept a commission in the U.S. Navy or Marine Corps when offered.

Enrollment in NROTC is not a requirement for taking naval science courses. Any student enrolled at George Washington University may take naval science courses with the approval of the Professor of Naval Science.

Secondary Field in Naval Science—A secondary field in naval science is available to all GW undergraduates. Specific information can be found at www.gwu.edu/~navyrotc. School policies on degree credit for naval science courses follow.

Columbian College of Arts and Sciences—NSc 2126, 2160, 4176, and 2180 are acceptable as electives. NSc 1051, 1052, 2125, 2150, 2151, or 2175 may be accepted as professional credit.

School of Engineering and Applied Science—NSc 2126 and 2160 may be used for social science credit. Technical elective credit is acceptable as follows: for majors in civil engineering and mechanical engineering—NSc 1052, 2150, 2175; for majors in electrical engineering—NSc 1052 and 2150; for majors in systems engineering—NSc 2150, 2151, 2175, and 4176.

School of Business—All NSc courses are applicable to the B.B.A. and B.Accy. degree programs; check with the director of undergraduate advising and student services in School of Business.

Elliott School of International Affairs—NSc 2126, 2160, 2175, 4176, and 2180 may be used as elective credit in all undergraduate programs.

1051 Introduction to Naval Science (3)

Introduction to the naval profession and to concepts of sea power. The mission, organization, and warfare components of the U.S. Navy and Marine Corps. Overview of officer and enlisted ranks and rates, training and education, and career patterns. Naval courtesy and customs, military justice, leadership, and nomenclature. Professional competencies required to become a naval officer.

1052 Naval Ships Systems I (Engineering) (3)

A detailed study of ship characteristics and types, including ship design and control, propulsion, hydrodynamic forces, stability, compartmentation, and electrical and auxiliary

systems. Included are basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion.

2125 Naval Ships Systems II (Weapons) (3)

Theory and employment of weapons systems, including the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapon types, including capabilities and limitations. Physical aspects of radar and underwater sound. Facets of command, control, and communications as means of weapons system integration.

2126 Sea Power and Maritime Affairs (3)

A survey of the U.S. naval history. Naval aspects of U.S. conflicts from the American Revolution to the global war on terror. The influence of technological innovation, domestic politics, and foreign policy on the development and execution of naval doctrine and tactics.

2150 Navigation (3)

Development of practical skills in naval piloting procedures. Charts, visual and electronic aids, and magnetic and gyro compasses; inland and international rules of the nautical road. The celestial coordinate system, including spherical trigonometry and how celestial information can be applied to navigation at sea. Environmental factors affecting naval operations.

2151 Naval Operations and Seamanship (3)

Relative motion vector analysis theory, formation tactics, and ship employment; practical skills in relative motion problems. Controllable and noncontrollable forces in shiphandling, ship behavior, and maneuvering characteristics; various methods of visual communication, including flaghoist, flashing light, and semaphore.

2160 Evolution of Warfare (3)

This course traces the development of warfare, from earliest recorded history to the present, with focus on the impact of major military theorists, strategists, tacticians, and technological developments. The student acquires a basic sense of strategy and develops an understanding of military alternatives and the impact of historical precedent on military thought and actions.

2175 Leadership and Management (3)

Organizational behavior, management, and leadership principles in the context of naval organization. The management functions of planning, organizing, leading, and controlling; individual and group behavior in organizations; motivation and leadership. Decision making, communication, responsibility, authority, and accountability.

2180 Amphibious Warfare (3)

A historical survey of the development of amphibious doctrine and the conduct of amphibious operations. The evolution of amphibious warfare in the 20th century, especially during World War II. Present-day potential and limitations on amphibious operations, including the concept of rapid deployment force.

4176 Leadership and Ethics (3)

A capstone course that completes the NROTC preparations for midshipmen commissioning as Ensigns and Second Lieutenants. Application of Western moral traditions and ethical philosophy to issues involving military leadership, core values, the Uniform Code of Military Justice, and Navy regulations.

ORGANIZATIONAL SCIENCES AND COMMUNICATION

Professors C. Warren (Chair), L. Offermann

Associate Professor D.P. Costanza

Assistant Professors J.C. Miller, N. Olsen, G. Debebe, T. Behrend

Adjunct Professor V. Grady

Professorial Lecturers Q. Ahmed, M.A. DiMola, E. van Iersel, B. Mello, R. Tovaes

Adjunct Instructors C.M. Clapp, C. Wood

Lecturers A. Weiner, D. Coultice-Christian, D. Cronin, P. Hanke, S. Ewing, J. Murdock

Bassett, S. Tomasovic, D. Tighe

The communication and organizational sciences majors are offered by the Department of Organizational Sciences and Communication. Students are accepted as communication majors through a selective application process. Applications are not accepted from students with more than 75 credit hours. A student may apply no more than twice to the major.

Expectations for admission include a GPA of 3.3 and completion of, or current enrollment in, one of three courses: Comm 1025, 1040, or 1041. Achievement of the expected GPA does not guarantee admission to the major because the acceptance process is selective.

Application forms and the Student Handbook for Communication Majors, which provides additional information about the major, including the application process, are available in the department office.

Bachelor of Arts with a major in communication—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in the major: Comm 1025, 1040, 1041, 2100, 3110, 4150, 4199; 18 additional hours of upper-division courses in communication, as approved by the major advisor.

3. Required courses in related areas: 15 credit hours of upper-division courses in one other department, program, or field of study, as approved by the major advisor; this requirement may be fulfilled by completion of a second major or a minor or secondary field other than organizational communication.

Bachelor of Arts with a major in organizational sciences—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Required courses in related areas: Econ 1011 or 1012, Stat 1053, and 6 credit hours of upper-level courses from one of the following areas: American studies, anthropology, communication, economics, geography, history, political science, psychology, or sociology. A list of approved courses fulfilling this requirement is available from the department.

3. Required courses in the major:

(a) OrSc 1109, 1046, 4161, 4197; Psyc 2144. (If a grade lower than C– is received for OrSc 1109 or 1046, the course must be repeated; credit for the repetition will not count toward the degree.)

(b) Six courses chosen from OrSc 2116, 2123, 2143, 3141, 3159, 3165, 3190, 4195; Comm 3170; Psyc 2160.

Special Honors in communication—Students may graduate with Special Honors if they meet the following criteria: (1) the Special Honors requirements stated under University Regulations; (2) selection to Lambda Pi Eta, the National Communication Association Honor Society, which maintains a chapter in the GW Communication Program (i.e., open to majors who have completed a minimum of 24 hours in communication course work, who hold a grade-point average of 3.3 in communication courses and a grade-point

average of 3.0 overall, and who are recommended by a majority of the full-time communication faculty); and (3) a grade of *A* on the thesis required in Comm 4199, Senior Seminar.

Special Honors in organizational sciences—To qualify for graduation with Special Honors, the student must meet the Special Honors requirements stated under University Regulations, submit an application to the department before the beginning of the senior year, take a graduate-level seminar with permission of the department, complete an independent study project in OrSc 4195 with a grade of *A–* or better, and have a grade-point average for courses required in the major of 3.5.

Minor in communication—Required: 18 credit hours, including Comm 1025, 1040 or 1041, 2120, 4150, and two upper-division electives in communication.

Minor in organizational communication—Required: 18 credit hours, including Comm 3170, 3171; OrSc 1109; Psyc 2144; plus two courses selected from Comm 2120, 2140, 3173, 3174, 3176; Psyc 2160.

Minor in organizational sciences—Required: 18 credit hours, including OrSc 1109, 2116, 2143; Psyc 2144; plus two courses selected from Comm 3170, 3171, 3173; Psyc 2160, 4193; or approved electives in organizational sciences.

Note: Within the Department of Organizational Sciences and Communication, any course counted toward the major may not also be counted toward the minor. Students taking more than one minor in the department may not double-count electives.

COMMUNICATION

1025 **Introduction to Communication Studies (3)**

Miller

Introduction to historical and intellectual development of the field. Students survey the origins of contemporary theory; learn about fundamental concepts, models, investigative tools, and contexts of communication; and explore a variety of professional opportunities awaiting communication graduates.

1040 Public Communication (3)

Staff

Study and practice of the basic techniques of public speaking used to inform, to entertain, and to persuade audiences. Emphasis on the speech-building process: audience analysis, research, development, composition, organization, style, delivery, and criticism.

1041 Interpersonal Communication (3)

Staff

Study and practice of verbal and nonverbal communication in ritual, information and perspective sharing, problem solving, and relationship formation, maintenance, and dissolution. Designed to raise awareness of the complexity and power of the communication process in daily life and to help students develop interpersonal skills cognitively, affectively, and behaviorally.

1042 Business and Professional Speaking (3)

Staff

Study of the communication process in business and professional organizations; practice in interviewing, small group communication, and public presentations. For non-majors and non-minors only.

2100 Communication Theory (3)

Clapp

Inquiry into the nature and function of communication theory as a framework for the study of communicative behavior. Emphasis is placed on analysis of paradigmatic approaches in rhetorical, interpersonal, and mass communication theories and models, and

on examination of contemporary research literature in communication. Prerequisite: Comm 1025.

2120 Small Group Communication (3)

Warren and Staff

The study and practice of communication in small groups, focusing on problem solving, norms, roles, and leadership. Prerequisite: Comm 1025 or permission of the instructor.

2140 Nonverbal Behavior (3)

Wood

Introduction to predominant theories, principles, and problems in the study of nonverbal behavior; application of research results to everyday life. Topics include facial expression, eye behavior, physical appearance, body movement and gestures, tactile messages, vocal characteristics, use of time, spatial dynamics, gender and life-stage differences.

3110 Research Methods (3)

Clapp

Processes of inquiry within interpersonal and public communication. Students are introduced to concepts of framing research questions, conducting literature reviews, developing a research design, using qualitative and quantitative research tools, and interpreting results of research in communication. Prerequisite: Comm 2100.

3170 Organizational Communication (3)

Staff

Exploration of the philosophy, process, problems, and potential of human communication within organizational contexts. May involve experiential workshops and fieldwork. Prerequisite: Comm 1041 or 2120 or permission of instructor.

3171 Professional Communication (3)

Clapp

Principles and theories of communication applied to situations encountered in organizational and professional environments. Development of knowledge and abilities for workplace tasks, such as interviewing, facilitating meetings, providing performance appraisals, designing and delivering instructional materials and other professional presentations.

3172 Health Communication (3)

Staff

Exploration of the nature, functions, and impact of relational communication in the context of health care. Both formal (health care organizations) and informal (family communication) systems may be studied. Topics can include provider–patient interaction, media and health, confirmatory communication. Prerequisite: Comm 1041 or 2100 or permission of instructor.

3173 Communication in a Mediated World (3)

Staff

An exploration of human-to-human communication mediated by computer technology. Traditional communication theories are applied and adapted to the computer-mediated realm; newer theories of computer-mediated communication are addressed.

3174 Intercultural Communication (3)

Miller

Exploration of the process, trends, rewards, and difficulties of human communication in intercultural contexts, with an eye toward establishing guidelines for mitigating miscommunication across cultures. May involve fieldwork. Prerequisite: Comm 1041 or permission of instructor.

3176 Issues and Image Management (3)

Staff

The issues and image management function in corporate, professional, and nonprofit organizations. Assignments may include in-class collaboration on case studies of

communication campaigns and crisis communication strategies, interviews with professionals in the practice of communication management, and a communication audit of strategies and messages of a selected organization.

3180 **Communication Criticism** (3) Miller

Evaluation of communication paradigms along critical dimensions of analysis.

Prerequisite: Comm 1040 or 4150 or permission of instructor.

3190 **Selected Topics** (3) Warren and Staff

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

4150 **Persuasion** (3) Warren

In-depth study of the principles and techniques of persuasion from both production and consumption perspectives, in both personal and mediated contexts. Emphasis on the common-premise model, with consideration of such topic areas as pathos/ethos/logos, attitude and behavior change, effectiveness, ethics, and subconscious influence.

Prerequisite: Comm 1025.

4196 **Independent Study** (1 to 3) Warren and Staff

Independent research and special projects. Open to seniors or exceptionally well-prepared juniors majoring in communication. Before students are permitted to register, they must submit a written proposal of the plan of study and obtain approval of the faculty member who will direct the study and of the program chair.

4197 **Internship** (3) Warren

For communication majors and minors. Student-secured internships in public or private communication-related organizations in the metropolitan area. Students spend at

least 15 hours per week doing communication-related work. Meetings, reports, and/or analysis paper are required. Admission requires prior program approval. Graded on a Pass/No Pass basis.

4199 Senior Seminar (3)

Warren, Miller

Capstone course limited to communication majors. Selected reading and discussion. Each student works on an individually designed research project throughout the term, the results of which will be presented in a major paper. Prerequisite: Comm 2100 and 3110.

ORGANIZATIONAL SCIENCES

1046 Membership in Global Organizations (3)

Debebe

The globalization of organizations has been the engine for the global movement of talented and skilled professionals, and organizations increasingly focus on the ability to attract, utilize, and develop globally mobile talent. Issues related to the formulation of global strategy and the leadership of global talent.

1109 Introduction to Organization and Social Systems Sciences (3) Costanza

The evolution of organizations in terms of social context and the present-day systems environment. Emerging roles of leadership, communication, and employer–employee relationships. Organizational models are used to develop strategic thinking about career and life roles.

2116 Leading Change (3)

Grady

An in-depth introduction to and analysis of concepts and techniques of leadership, including motivation, goal alignment, incentives, teamwork, and communication. Conceptual and empirical background of the management of change.

2123 Negotiation and Conflict Resolution (3)

Staff

Theories in psychology, management, and communication as applied to individual-, group-, and organizational-level contexts of negotiation and conflict resolution.

2143 Leadership and Performance (3)

Debebe

Leadership from an organization system perspective. Theory, research, and applications pertaining to how leaders can reduce uncertainty through appropriate adaptive change.

3141 Strategy in Organizations (3)

Staff

Processes and theories of strategic management in the profit and nonprofit sectors. Analysis of behavioral, sociopolitical, and economic forces underlying strategy formulation. Strategic competitive advantage; corporate diversification; multinational corporations; evaluation and choice; and implementation of functional and corporate strategies.

3159 Organizational Decision Making (3)

Olsen

Processes in organizational decision making and group behavior. Topics include group and individual decision-making approaches, decision aids and support systems, performance and decision effectiveness, and risk analysis.

3165 Organizational Network Analysis (3)

Staff

A relational view of organizations, emphasizing the ways in which business, non-profit, public, and governmental entities engage with a multitude of actors in pursuit of their goals. Organizational embeddedness and how an organization's position in a web of relations helps or hinders it.

3190 Special Topics (3)

Staff

Topics to be announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

Costanza

4195 **Independent Research (1 to 3)**

Staff

4197 **Senior Research Seminar (3)**

Staff

PEACE STUDIES

See Religion.

PERSIAN

See Classical and Near Eastern Languages and Literatures.

PHILOSOPHY

Professors W.B. Griffith, R.P. Churchill, D. DeGrazia, G. Weiss (Chair)

Associate Professors J.C. Brand-Ballard, T. Zawidzki

Assistant Professors M. Friend, E.J. Saidel, M. Ralkowski

Adjunct Professors C. Venner, T. Romanovskaya, M. Sigrist, A. Pedferri

Professorial Lecturers R. Carr, L. Eby

Two options are offered for the major in philosophy, both designed to give a broad background in philosophy but with somewhat different emphases. The first option reflects the traditional structure of the discipline and its subfields; it is especially (but not exclusively) recommended for those considering the possibility of graduate study in philosophy. The second option is designed for those primarily interested in philosophy in its relationship to public affairs.

Bachelor of Arts with a major in philosophy (traditional option)—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Recommended courses—Phil 1051, 2045.
3. Required courses in the major—a minimum of 30 credits, including Phil 2111, 2112; six upper-division philosophy courses chosen in consultation with a departmental advisor; and either 6 credits of Phil 4198 or 3 credits each of Phil 4198 and 4199 and an honor thesis.

Bachelor of Arts with a major in philosophy (public affairs focus)—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Recommended courses—Phil 1051, 2045.
3. Required courses in the major—a minimum of 30 credits, including Phil 2111 or 2112 and Phil 2131 or 2132; six upper-division philosophy courses chosen in consultation with a departmental advisor; and either 6 credits of Phil 4198 or 3 credits each of Phil 4198 and 4199 and an honor thesis.

Combined Bachelor of Arts with a major in philosophy (public affairs option)/Master of Arts in the field of public policy with a concentration in philosophy and social policy— Students interested in this program should consult the director of graduate studies as soon as possible.

Special Honors—In addition to the general requirements stated under University Regulations, in order to be considered for graduation with Special Honors, a student must (1) have at least a 3.7 grade-point average in the major and a 3.25 average overall; (2) submit an honors paper prepared under the supervision of a faculty advisor in the department. Only if a committee of three faculty members in the department approves the honors paper will Special Honors be recommended.

Minor in philosophy—Required: a minimum of 18 credit hours of philosophy courses, including two courses chosen from Phil 2111, 2112, 3113, 3172, 4192, 4193 and four elective courses, of which not more than one may be at the 1000 level.

Minor in logic—Required: 18 credit hours of logic-focused courses, of which 12 credits must be upper-division, with at least one course in philosophy and one course in mathematics. Courses are chosen with approval of the advisor from lists of designated courses in philosophy, mathematics, computer science, and linguistics. No more than two courses may count toward both the student's major and the minor in logic.

Minor in applied ethics—Required: 18 credit hours of philosophy courses, including Phil 1051, 2131, and 2132, plus Phil 2133, 2135, 3142, or with permission of the instructor, seniors may select from Phil 6230, 6231, 6238, 6242, 6250, 6262, which are listed in the Graduate Programs Bulletin.

Minor in mind–brain studies—Required: a minimum of 18 credit hours, including Phil 3153 and Psyc 3122, plus four electives chosen from designated courses in anthropology, philosophy, psychology, and speech and hearing science, with no more than two electives drawn from any one department.

1051 **Introduction to Philosophy** (3) Staff

Readings from major philosophers and study of their positions on the most basic questions of human life. Topics include such issues as: What is justice? What is knowledge? What is reality? Does God exist? What is the mind? Do humans have free will? (Fall, spring, and summer)

1062 **Philosophy and Film** (3) Staff

Philosophical problems and theories of perception, meaning, personal identity, and moral agency and their illustration in the context of cinema. Cinema and its derivatives (TV, video) as prime routes to experience of the natural and social worlds in an age of communication. Readings in classical and contemporary philosophy and in film theory; screening of a series of films. (Spring)

1153 **Meaning of Mind** (3) Zawidzki

The nature of the human mind is one of the oldest questions of philosophy. Students with no background in philosophy or the sciences of the mind are introduced to the central questions, assumptions, and hypotheses about the human mind.

1193 **Introduction to Existentialism** (3) Weiss, Ralkowski, and Staff

The philosophical themes of selfhood, mortality, authenticity, and ethical responsibility from an existentialist perspective, including the writings of Kierkegaard,

Heidegger, Nietzsche, Camus, and Sartre. The place of existentialism in the history of philosophy.

2045	Introduction to Logic (3)	Friend, Saidel, Romanovskaya, and Staff
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Introduction to informal logic, scientific argument, and formal logic. The informal logic component focuses on fallacies of reasoning and practical applications of logic. The formal logic component focuses on translation from English into propositional logic, truth tables, and proofs in propositional logic. (Fall, spring, and summer)

2111 **History of Ancient Philosophy (3)** Ralkowski

History of Western philosophy from the Pre-Socratics to the Stoics (6th century BCE to 1st century CE). Major emphasis on the writings of Plato and Aristotle. Among themes to be covered: knowledge and reality, political and moral philosophy. (Fall and spring)

2112 **History of Modern Philosophy (3)** Churchill, Ralkowski

History of Western philosophy of the 16th through 18th centuries; Continental Rationalism and British Empiricism from the scientific revolution through the Enlightenment; major emphasis on Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. Prerequisite: Phil 1051 or equivalent. (Fall and spring)

2124 **Philosophies of Disability (3)** Weiss and Staff

Disability presents an intense and interesting challenge to traditional philosophical presuppositions and principles. This course examines various philosophical approaches to disability—historical, individual, and medical paradigms as well as those that rely on frameworks of social or human rights.

2125 **Philosophy of Race and Gender (3)** Weiss and Staff

A theoretical examination of the bodily, social, discursive, and political effects of patriarchy, racism, and classism. (Fall and spring)

2131 Ethics: Theory and Applications (3) Brand-Ballard, DeGrazia, and Staff

Examination of leading ethical theories (e.g., utilitarianism, deontology, virtue ethics), and methodology in ethics. Engagement with contemporary problems. (Fall and spring)

2132 Social and Political Philosophy (3) Brand-Ballard, Churchill, and Staff

Philosophical theories about how economic, political, legal, and cultural institutions should be arranged. Topics include the meaning and significance of liberty, the legitimate functions of government, the nature of rights, the moral significance of social inequality, and the meaning of democracy. (Fall and spring)

2133 Philosophy and Nonviolence (3) Churchill

Violence and nonviolence in the personal and social struggle for meaningful, just, and peaceful existence; philosophical foundations of pacifism and nonviolent resistance in the thought of Tolstoy, Gandhi, King, and others; philosophical inquiry into war, terrorism, genocide, and ethnic conflict, as well as human rights, humanitarian intervention, and just war theory. (Fall)

2135 Ethics in Business and the Professions (3) Staff

Ethical theories and basic concepts for analysis of moral issues arising in business and in professional practice. (Fall and spring)

2281 Philosophy of the Environment (3) Friend

Three models of environmental sustainability: the current paradigm in economic and cultural thinking (neoclassical economics); redistribution of resources toward greater global equity (a macroeconomic perspective); and de-growth in the developed economies

(ecological economics). The models offer different perspectives on what environmental sustainability means and how it can impact the cultural, religious, moral, metaphysical, and existential situation.

3113 **19th-Century Philosophy** (3) Carr and Staff

European philosophy of the 19th century, with major emphasis on Kant, Hegel, Schopenhauer, Kierkegaard, and Nietzsche. Prerequisite: Phil 1051 or equivalent. (Fall)

3121 **Symbolic Logic** (3) Friend, Romanovskaya, and Staff

Analysis and assessment of deductive arguments, using propositional, predicate, and other logics; philosophical basis and implications of logical analysis; metatheory of logic; modal and non-standard logics. Prerequisite: Phil 1045 or permission of instructor. (Fall and spring)

3142 **Philosophy of Law** (3) Brand-Ballard

Systematic examination of fundamental concepts of law and jurisprudence; special emphasis on the relationship between law and morality. (Fall)

3151 **Philosophy and Science** (3) Zawidzki

Analysis of the structure and meaning of science, including scientific progress and theory change, objectivity in science, the drive for a unified science, and ways science relates to everyday understandings of the world. Attention given to various sciences, including physics, biology, and neuroscience. Prerequisite: Phil 1051 or two semesters of college-level science. (Fall)

3152 **Theory of Knowledge** (3) Zawidzki

Inquiry into the basis and structure of knowledge, the problems of skepticism and justification, the relations between subjectivity and objectivity, and the contributions of

reason, sense experience, and language. Prerequisite: Phil 1051 or equivalent; Phil 2112 also recommended. (Spring)

3153 **Mind, Brain, and Artificial Intelligence** (3) Zawidzki, Saidel

Investigation of the nature of mind from a variety of perspectives, including neuroscience, cognitive psychology, and artificial intelligence, as well as traditional philosophy of mind. Possible additional topics include consciousness, mental disorders, animal minds, and the nature and meaning of dreams. (Spring)

3161 **Philosophy and Literature** (3) Weiss

Critical investigation of the sociopolitical commitments that inform the practices of reading and writing as discussed by Sartre, Barthes, Foucault, and others. Focus on the development of existentialist themes, including authenticity, freedom, temporality, and death in the work of Kafka, Tolstoy, Mann, Woolf, and others. (Fall, alternate years)

3162 **Aesthetics** (3) Weiss and Staff

The problem of artistic representation and the nature of aesthetic experience as related to the creation, appreciation, and criticism of art. Special emphasis on nonrepresentational works of art and their interpretation. Prerequisite: Phil 1051 or 2111 or 2112 or 3113. (Fall)

3172 **American Philosophy** (3) Carr

A survey of American philosophical thought, focusing on the late 19th through mid-20th centuries. Covers American Pragmatism (Peirce, James, Dewey) in depth; other authors may include Thoreau, Emerson, Royce, Santayana, Mead, Quine, and Rorty. (Spring)

3251 **Philosophy of Biology** (3) Saidel, Zawidzki

An introduction to conceptual and methodological issues raised by contemporary biology, including teleology, reductionism, units of selection, the structure of evolutionary theory, genetics, taxonomy, and the nature of scientific explanation. Other issues may include the nature–nurture debate, creationism/intelligent design, the evolution of altruism, and the relevance of evolutionary theory to ethical questions.

4192 **Analytic Philosophy (3)**

Saidel, DeGrazia

The dominant movements of 20th-century Anglo-American philosophy, including logical positivism, British ordinary language philosophy, and neopragmatism, as represented by Russell, G.E. Moore, Wittgenstein, Ayer, Quine, Kripke, et al. Prerequisite: one other upper-division philosophy course (Phil 2112 and 3121 recommended). (Fall)

4193 **Phenomenology and Hermeneutics (3)**

Weiss, Ralkowski

An intensive, systematic introduction to the phenomenological and hermeneutic traditions in philosophy through some of their best-known representatives: Husserl, Heidegger, Gadamer, Sartre, Beauvoir, and Merleau-Ponty. Central topics of discussion include consciousness, anguish/anxiety, discourse, interpretation, the Other, death, and ambiguity. Prerequisite: Phil 2112 or 3113.

4195 **Topics in Value Theory (3)**

Staff

Variable topics in ethics, political philosophy, aesthetics, and other subfields in normative philosophy. Prerequisite: one upper-division course on related subject matter or permission of the instructor.

4196 **Topics in Theory of Knowledge (3)**

Staff

Variable topics in epistemology, philosophy of science and mathematics, philosophy of mind, and similar subfields. Prerequisite: one upper-division course on related subject matter or permission of the instructor.

4198 **Proseminar** (3)

Staff

Variable topics; preparation and presentation of a major research paper. Open only to philosophy majors in the junior and senior year as approved by major advisor. May be repeated for credit. (Fall and spring)

4199 **Readings and Research** (1 to 3)

Staff

(Fall and spring)

PHYSICS

Professors L.C. Maximon (*Research*), W.J. Briscoe, M.E. Reeves, I. Strakovsky

(*Research*), A.K. Oppen (*Chair*), G. Feldman, F.X. Lee, A. Eskandarian, C. Zeng

Associate Professors H. Haberzettl, K.S. Dhuga, R.L. Workman (*Research*), W. Peng, H.

Griesshammer, A. Afanasev

Assistant Professors G. Wang (*Research*), A. Alexandru, X. Qiu, M. Paris (*Research*), E.J.

Downie, B.C. Kung, R. Teodorescu (*Teaching*), A. Corsi, O. Karaltsev, G. Lan

Professorial Lecturers J.T. Broach, M.F. Corcoran, P. Butterworth, C. O'Donnell, A.

Moscato, L. Medsker, I. Moskowitz

Bachelor of Arts with a major in physics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Phys 1021, 1022, 1023; Math 1231, 1232, 2233.

3. Required courses in related areas—Chem 1111 or BiSc 1111 or 1112; one approved upper-division math course.

4. Required courses in the major—Phys 2151 or 2152, 2161, 2164, 2165, 2167, and two approved upper-division physics electives (Phys 4195 is recommended).

Bachelor of Science with a major in physics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Prerequisite courses—Phys 1021, 1022, 1023; Math 1231, 1232, 2233.

3. Required courses in related areas—Chem 1111 or BiSc 1111 or 1112; one approved course in computer programming and two approved upper-division math courses.

4. Required courses in the major—Phys 2151 or 2152, 2161, 2164, 2165, 2167, 4195 or 4196 or 4197, and two approved upper-division physics electives.

Bachelor of Science with a major in biophysics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Prerequisite courses—Phys 1021, 1022, 1023; Math 1231, 1232, 2233.

3. Required courses in related areas—Chem 1111–12, 2151–52; BiSc 1111, 1112, 3209, and either 3261 or another approved upper-division BiSc course; Stat 1127; one approved computer programming course.

4. Required courses in the major—Phys 2127, 2128, 2151 or 2152, 2161, 2164, 2165, 4195 or 4196 or 4197.

Special Honors—To graduate with Special Honors, a student must meet the eligibility requirements stated under the University Regulations and submit for departmental approval

an honors thesis based on a two-semester research project. In addition, the student must have a cumulative grade-point average of at least 3.5 in physics courses and 3.5 overall.

Minor in physics—Required: Phys 1021, 1022, 1023, plus two approved upper-division physics courses.

Minor in biophysics—Required: Phys 1021, 1022, 1023, 2127, 2128.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

ASTRONOMY

1001 Stars, Planets, and Life in the Universe (4)

Primarily for non-science majors. An introduction to how our Universe is structured, including the basic principles underlying astronomical systems and observations. Topics include the known laws of nature, stars, and planetary systems and the conditions for extraterrestrial life and exploration. Prerequisite: high school algebra. Laboratory fee. (Fall and spring)

1002 Origins of the Cosmos (3)

Primarily for non-science majors. A description of the Universe, its origins and its evolution, based on known physical principles. Topics include galactic and stellar structure, black holes, origin of the elements, and big bang cosmology. Prerequisite: high school algebra. Laboratory fee. (Fall and spring)

2161 Space Astrophysics (3)

Physical processes of celestial phenomena as determined from space-based instrumentation. While the entire electromagnetic spectrum is covered, the high-energy (X-

ray and gamma ray) region is emphasized. Results from ground-based instrumentation (e.g., radio and optical) may be introduced. Prerequisite: Phys 1022 or equivalent.

2183 General Relativity (3)

A presentation of Einstein's general theory of relativity. Topics include the special theory of relativity, the nature of space and time, the equivalence principle, Riemannian geometry, Einstein's proposal, tests of the theory, Schwarzschild and Kerr solutions, Hawking radiation, and cosmological models. Prerequisite: Phys 1023; Math 2233.

4195 Undergraduate Research in Astrophysics (3)

Research on problems in astrophysics approved by the faculty. May be repeated once for credit.

PHYSICS

1003 Physics for Future Presidents (3)

A serious but accessible presentation of topics important for leaders to know—energy, global climate, high-tech devices, space travel, nuclear weapons, etc. Students possessing any level of scientific background are equipped with the concepts and analytical tools needed to make informed decisions and to argue their view persuasively. Laboratory fee. (Fall)

1005 How Things Work (4)

Primarily for non-science majors. Physical principles are introduced through a study of everyday objects to see what makes them tick. This unconventional approach is primarily conceptual in nature and intended for students seeking a connection between science and the world in which they live. Prerequisite: high school algebra and trigonometry. Laboratory fee.

(Spring)

1007 Music and Physics (4)

Primarily for non-science majors. A comparative study of music and physics, showing parallels in the history of the two fields and emphasizing those topics in physics related to the theory of music and the production of sound by musical instruments, particularly classical mechanics and wave motion. Prerequisite: high school algebra and geometry.

Laboratory fee. (Fall)

1008 Origin and Evolution of Ideas in Physics (4)

Primarily for non-science majors. The evolution of ideas and their historical continuity in the search for basic physical theories. By presenting the world-views of great physicists of the past, the division of physics into many sub-disciplines is avoided and a humanistic approach is achieved. Prerequisite: high school algebra. Laboratory fee.

1011 General Physics I (4)

Classical physics. Mechanics, including Newton's laws of motion, force, gravitation, equilibrium, work and energy, momentum, and rotational motion; periodic motion, waves, and sound; heat and thermodynamics. Prerequisite: high school trigonometry. Laboratory fee. (Fall and spring)

1012 General Physics II (4)

Classical and modern physics. Electrostatics, electromagnetism, direct and alternating current circuits, and electromagnetic radiation; geometrical and physical optics; special relativity; quantum theory; atomic physics; nuclear physics; particle physics; astrophysics and cosmology. Prerequisite: Phys 1011. Laboratory fee. (Fall and spring)

1021 University Physics I (4)

Classical mechanics and thermodynamics using calculus. Newtonian mechanics: force, momentum, work and energy, mechanical equilibrium, linear, and rotational motion. Gravitation and fields. Atoms, physical properties of matter. Energy transfer and waves, sound. Prerequisite: Math 1231; corequisite: Math 1232. Laboratory fee. (Fall and spring)

1022 University Physics II (4)

Periodic motion, waves, and classical electromagnetism using calculus. Waves and sound. Electrostatics, Gauss's law, capacitance. Electric resistance, electric current. Magnetism. Electrodynamics and electromagnetic induction. Maxwell's theory and electromagnetic radiation. Geometric and physical optics. Prerequisite: Phys 1021. Laboratory fee.

(Fall and spring)

1023 University Physics III (3)

Modern physics using calculus. Relativity. Wave-particle duality, quantum mechanics. The hydrogen atom, Pauli principle. Quantum statistics and radiation. Quantum theory of the condensed state, superconductivity.

Nuclear physics. Applications to astrophysics and nucleosynthesis. General relativity. The big bang theory. Prerequisite: Phys 1022, Math 2233. (Fall)

2127 Biophysics: Macroscopic Physics in the Life Sciences (3)

Physical principles applied to biological systems and medicine, and current instrumentation and technology. Topics include blood flow, ultrasonics, spectroscopy, radiation biology, bioenergetics, ordering theory, and neural networks. Prerequisite: Phys 1012 or 1022; Math 2233. (Fall)

2128 Biophysics: Microscopic Physics in the Life Sciences (3)

Physical principles applied to biological systems on the nanometer scale. Topics include intermolecular forces, statistical principles applied to biological microstates, determining protein and nucleic acid structures, operation of protein motors and transport systems, together with nanotechnology and instrumentation. Prerequisite: Phys 1012 or 1022; Math 2233. (Spring)

2151 Intermediate Laboratory I: Techniques and Methods (3)

Experiments in electromagnetism, classical and quantum mechanics, atomic and nuclear physics with emphasis on experimental methods. Corequisite: Phys 1023. Laboratory fee. (Fall and spring)

2152 Intermediate Laboratory II: Instrumentation (3)

Elementary electric and electronic analog and digital circuits. Topics include passive and active components in DC and AC circuits and operational amplifiers, with emphasis on measurement techniques. Laboratory fee.

(Spring)

2161 Mechanics (3)

Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations. Prerequisite: Phys 1023; Math 2233. (Spring)

2163 Physical and Quantum Optics (4)

Wave motion, electromagnetic aspects of light, dispersion of light in media, geometrical optics, polarization and optical properties of crystals, interference, diffraction, lasers, holography. Mathematical tools, including Fourier methods, developed as needed.

The quantum description of light complements the classical description. Prerequisite: Phys 1023; Math 2233. Laboratory fee.

2164 Thermal and Statistical Physics (3)

Principles and application of thermodynamics to reversible and irreversible processes, with derivation from statistical postulates applied to the microscopic behavior of large systems at or near equilibrium. Topics include equilibrium thermodynamics, statistical mechanics, and kinetic theory of gases. Prerequisite: Phys 1023; Math 2233. (Spring)

2165 Electromagnetic Theory I (3)

Electrostatics and magnetostatics, electric and magnetic fields in matter, scalar and vector potentials, electromagnetic induction. Maxwell's equations. The methods of vector and tensor calculus are developed as needed, as are the method of images, Fourier series, and some computational methods. Prerequisite: Phys 1023; Math 2233. (Fall)

2166 Electromagnetic Theory II (3)

Conservation laws, electromagnetic waves, radiation, relativistic formulation of electrodynamics and potential fields. Prerequisite: Phys 2165. (Spring)

2167 Principles of Quantum Physics (3)

The conceptual framework and mathematical formalism of quantum mechanics. Wave-particle duality, wave functions, and eigenvalues. Schrödinger Equation and one-dimensional potential problems. Angular momentum, central potentials, and the hydrogen atom. Identical particles and spin. Scattering theory. Perturbation theory. Prerequisite: Phys 1023; Math 2233. (Fall)

2170 Solid-State Physics (3)

Structure of solids, lattices and lattice defects, deformation, vibrational and electronic contribution to specific heats, binding energies, electronic states in metals and semiconductors, magnetic properties of solids, superconductivity. Prerequisite: Phys 2167 or permission of instructor. (Spring)

2175 Nuclear Physics (3)

Application of quantum physics to the description of nuclei and their interactions. Properties of nuclei, nuclear models, nuclear forces, and nuclear reactions are considered. Specific topics include the deuteron, n-p scattering, the optical model, the shell model, the liquid-drop model, beta decay, fission, and fusion. Prerequisite: Phys 2167 or permission of instructor. (Spring)

2181 Computational Physics (3)

Topics include celestial mechanics, chaotic systems, fluid dynamics, and other such complex systems that require a computational approach. Prerequisite: Math 2233; at least one upper-division physics course; working knowledge of C, FORTRAN, or Java. Laboratory fee.

2190 Special Topics in Physics (1 to 4)

Courses offered by visiting faculty or other experimental offerings. Topics announced on a semester basis. May be repeated for credit provided the topic differs.

2192 Independent Study in Physics (1 to 3)

Independent readings or directed study under the supervision of a faculty member. Credit varies, depending upon the nature of the work. May be repeated once for credit.

4195 Undergraduate Research (3)

Research on problems in physics approved by the faculty. May be repeated once for credit.

4196 Undergraduate Research in Biophysics (3)

Research on problems in biophysics approved by the faculty. May be repeated once for credit.

4197 Undergraduate Research in Nuclear Physics (3)

Research on problems in nuclear physics approved by the faculty. May be repeated once for credit.

POLITICAL COMMUNICATION

See **Media and Public Affairs**.

POLITICAL SCIENCE

University Professors M. Barnett, M. Finnemore

Professors H.R. Nau, C. McClintock, M.J. Sodaro, S.L. Wolchik, D. Shambaugh, C.J.

Deering, H.B. Feigenbaum, N.J. Brown, H.L. Wolman, F. Maltzman, S.K. Sell, B.

Dickson, P. Wahlbeck (*Chair*), S. Binder, M.E. Brown, J.H. Lebovic, C. Glaser, S.

Biddle

Associate Professors R.P. Stoker, A. Bowie, M.M. Mochizuki, S.J. Balla, S. Wiley, I.

Creppell, M. Lynch, K.J. Morgan, H.E. Hale, H. Farrell, E.D. Lawrence, J.M. Sides,

A. Downes, E.J. Teitelbaum

Assistant Professors W.J. Winstead, S. Kelts, G.S. Lambright, R.F. Adcock, E. Saunders, L.

Hughes, C. Mylonas, B. Bartels, S. Kaplan, E. Grynaviski, C. Talmadge, C. Arrington,

D. Hayes, E. Finkel, R. Stein

Bachelor of Arts with a major in political science—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite: PSc 1001, 1002, and 1003 (or the equivalent). Six courses in the social sciences, other than political science, including at least two history or two economics courses. (In addition to the CCAS General Curriculum Requirements list of courses in social and behavioral sciences, courses in history, peace studies, and women's studies are considered social sciences for this requirement.) Twelve credit hours of introductory foreign language and statistics are strongly recommended.
3. Required courses in the major: 30 credit hours of upper-division political science courses, including a distribution requirement that consists of PSc 2101 and one course selected from each of the following groups: Group A (comparative politics)—PSc courses numbered in the 2300s and 2993; Group B (American government and politics)—PSc courses numbered in the 2200s and 2992; Group C (international politics, law, and organizations)—PSc courses numbered in the 2400s and 2994; Group E (political thought)—PSc courses numbered in the 2100s and 2991.

No more than 3 hours of PSc 2987 Internship may be credited toward the major; this course does not satisfy the distribution requirement. Specific group credit for offerings of PSc 2990 Selected Topics is determined by the undergraduate advisor.

Every major must complete PSc 3192 Proseminar (which counts toward the 30-hour requirement but does not satisfy group distribution requirements) in the junior or senior year. A graduate course may be substituted for the proseminar requirement with the written permission of the instructor and the undergraduate advisor.

Bachelor of Arts with a major in political science (public policy focus)—

Requirements are the same as for the B.A. with a major in political science with the required 30 credit hours of upper-division courses in political science distributed as follows: PSc 2101; 9 credit hours in policy-oriented courses to be selected from PSc 2212, 2217, 2222, 2224, 2446; one policy-oriented proseminar; 3 credit hours from each of Groups A, B, C, and E; and 3 credit hours in an upper-division political science elective. The six courses in other social sciences must include Econ 1011–12, 2101, and a course selected from Econ 2135, 2159, 3161, 3162 or Soc 2105, 2112, 2161, 2170; Stat 1053 and a course selected from Stat 1129, 2118, 2123, 2183.

Combined bachelor's/master's dual degree programs—Six master's programs can be undertaken in combination with the Bachelor of Arts with a major in political science. Departmental majors should consult the undergraduate program advisor at the beginning of the junior year (after completing 60 credit hours at GW) for the combined degree programs that lead to the Master of Arts in the field of legal institutions and theory, the Master of Professional Studies in the fields of political management and of legislative affairs, the Master of Public Policy (the M.P.P. is available only to majors in the public policy focus), and the Master of Public Administration. For the combined degree program leading to the Master of Arts in the field of political science, students should consult the undergraduate program advisor as soon as possible in order to select courses appropriately; the program is available only to students who qualify for Special Honors.

Special Honors—Students may apply for graduation with Special Honors. To qualify, a student must fulfill the general requirements stated under University Regulations and have a GPA in the major of 3.5 or higher. Those with a GPA in the major of 3.8 and higher will

then be recommended for Special Honors. Those with a GPA in the major between 3.5 and 3.7 must complete an independent research project, usually done in PSc 3192, that has been approved as meriting Special Honors by two members of the Political Science faculty.

Minor in political science—Required: PSc 1001, 1002, and 1003 (or the equivalent) plus 12 credit hours of upper-division political science courses, including PSc 2101 and one course from Group E. A minimum of 9 credit hours of other social science courses is also required.

With permission of the instructor and the undergraduate advisor, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: PSc 1001 is prerequisite to Group A courses (comparative politics), PSc 1002 is prerequisite to Group B courses (American government and politics), and PSc 1003 is prerequisite to Group C courses (international politics, law, and organizations). Courses are defined by their group under item 3, above. Honors course equivalents are acceptable substitutes. Students who have taken PSc 1011–12 have fulfilled prerequisites to all three groups. Elliott School students substitute IAff 1005 for PSc 1003 as a prerequisite to Group C courses. Qualified juniors and seniors who are not political science majors and who wish to take upper-division PSc courses without having the appropriate prerequisites may do so only with the written permission of the instructor.

1001 **Introduction to Comparative Politics (3)**

Sodaro, Dickson,

Morgan, Teitelbaum

Concepts and principles of comparative analysis, with an examination of politics and government in selected countries.

1002 **Introduction to American Politics
and Government (3)**

Maltzman, Deering, Sides, Hayes

Structure, powers, and processes of the American political system and the impact on public policy.

1003 **Introduction to International Politics (3)**

Nau, Sell, Talmadge, Stein

Analysis of world politics, focusing on the role of nation-states and international organizations and on selected foreign policy issues.

1011–12 **Politics and Values (6–6)**

Kelts

Role of personal and social values in politics. Fall: Problems in the Western (especially American) tradition of political science. Spring: Thinking outside the Western state: culture, nationalism, ethnic conflict, democratization, international conflict.

Admission by special selection process.

2101 **Scope and Methods of Political Science (3)**

Lebovic, Wahlbeck, Wiley,

Lawrence, Bartels, Balla

Nature of political inquiry, approaches to the study of politics and government, empirical methods of research.

2105–6 **Major Issues of Western Political Thought (3–3)**

Creppell, Kelts,

Adcock, Winstead

PSc 2105: foundations of Western political thought—Plato to Aquinas. PSc 2106: history of political thought from the 16th through the late 19th century, as set forth in the works of representative thinkers.

2107 **20th-Century Political Thought (3)**

Creppell, Winstead

Recent Western political thought; analysis and critique of the legacies of modern political theories and ideologies.

2108 **Freedom and Equality** (3) Kelts

Case analysis of major ideas related to freedom and equality in the Western political tradition.

2110 **American Political Thought** (3) Staff

Political thought in the U.S. from colonial times to the present as seen through major representative writings.

2120 **Freedom in American Thought and Popular Culture** (3) Staff

Same as AmSt 2120.

2211 **State and Urban Politics** (3) Wolman

Comparative analysis of context, institutions, processes, and policies of state and urban political systems.

2212 **State and Urban Policy Problems** (3) Wolman

Selected issues in state and urban policymaking, with emphasis on urban and metropolitan settings.

2213 **Judicial Politics** (3) Wahlbeck, Bartels

An examination of judicial process and behavior. Emphasis on judicial selection, decision making, interaction with the political environment, and impact and implementation of decisions.

2214–15 **U.S. Constitutional Law and Politics** (3–3) Wahlbeck, Bartels

PSc 2214: Separation of powers, federal–state relationships, economic regulation. PSc 2215: Political and civil rights.

2216 **The American Presidency (3)**

Maltzman, Lawrence

Examination of the politics of presidential selection, the authority of the contemporary institution, the mechanisms and processes for formulating public policy, and the influences of personality on performance in office.

2217 **Executive Branch Politics (3)**

Balla

Basic concepts in public administration; influence of bureaucratic politics on policy formulation and implementation. Same as PPPA 2117.

2218 **Legislative Politics (3)**

Deering, Maltzman, Binder

Theory, structure, and process of the U.S. Congress, with emphasis on elections, party organization, committees, and floor procedure, in the context of executive–legislative relations and interest-group activities.

2219 **Political Parties and Interest Groups (3)**

Binder

Role of parties as a linkage between mass preferences and government policies. Organization, nominations, voting, and activities in legislative and executive branches.

2220 **Public Opinion (3)**

Sides, Hayes

How public opinion is measured, how it is shaped, and its consequences for policymaking.

2222 **Science, Technology, and Politics (3)**

Rycroft

Multiple impacts of scientific and technological developments on the political systems. Discussion of public policies for support, use, and control of science and technology.

2223 **Campaigns and Elections (3)**

Sides, Hayes

Examination of the various forms of American political participation in electoral and governmental politics and their effects on the political process.

2224 **Issues in Domestic Public Policy (3)** Stoker, Balla

Examination of the decision-making process and the substance of various issues in domestic public policy in such areas as crime, economics, education, energy, the environment, poverty, and health.

2225 **Women and Politics (3)** Morgan

An examination of the role and impact of women in politics, including women's interests and access to the political system; specific public policy issues with a particular focus on the role of women.

2228 **Media, Politics, and Government (3)** Staff

Same as SMPA 3428.

2229 **Media and Politics (3)** Sides, Hayes

The impact of the media on American politics, including the nature of coverage of political issues and campaigns, dynamics of selecting and presenting news stories, and consequences of media messages for public opinion and action.

2330 **Comparative Politics of Western Europe (3)** Feigenbaum

Comparative political analysis with primary focus on the principal states of Western Europe.

2331 **Comparative Politics of Central and Eastern Europe (3)** Wolchik

Specific countries vary, to include nations of central and Eastern Europe and/or the newly independent states of the former Soviet Union.

2332 **European Integration (3)** Mylonas

The history of the European Union, its accomplishments as an international actor, and the vibrant debates over its future.

2334 **Global Perspectives on Democracy (3)** Brown, Dickson

International experiences with the historical evolution and current nature of democratic political systems.

2336 **State–Society Relations in the Developing World (3)** Bowie

Historically informed exploration of enduring issues of concern in state–society relations, with an empirical focus on selected countries and regions of the developing world.

2337 **Development Politics (3)** Lambright

An examination of how and why political systems develop the way they do. Why do some countries develop into democracies, while others become authoritarian? How do class conflict, the nature of the elite, and the political culture affect the development of political institutions?

2338 **Nationalism (3)** Mylonas

Causes and the effects of nationalism, covering cases from around the world.

2366 **Government and Politics of Russia (3)** Hale, Finkel

An examination of political institutions, processes, and issues of Russian politics.

2367 **Human Rights (3)** Staff

Human rights theory, the various movements for human, religious, civil, political, and other rights.

2369 **Comparative Politics of South Asia (3)** Teitelbaum

A comparative examination of colonialism, economic development, and identity politics in South Asia.

2370 **Comparative Politics of China and Northeast Asia (3)** Dickson

Political institutions and processes of China (including Taiwan), Japan, and Korea since World War II. Influence of indigenous traditions and foreign contacts.

2371 **Politics and Foreign Policy of China (3)** Shambaugh, Dickson

An examination of political institutions, processes, history, and issues of Chinese politics and foreign policy.

2373 **Comparative Politics of Southeast Asia (3)** Bowie

Political forces, processes, and outcomes, using empirical examples from Southeast Asia.

2374 **Politics and Foreign Policy of Japan (3)** Mochizuki, Hughes

An examination of political institutions, processes, and issues of Japanese politics and foreign policy.

2377 **Comparative Politics of the Middle East (3)** Brown

Politics of the eastern Arab states, Turkey, Iran, and Israel.

2379 **Politics and Foreign Policy of Israel (3)** Finkel

Examination of the institutions, processes, and issues of Israeli politics and foreign policy.

2381 **Comparative Politics of Middle and Southern Africa (3)** Lambright

Comparative analysis of political systems in selected countries of non-Mediterranean Africa.

2383 **Comparative Politics of Latin America (3)** McClintock

The politics of selected countries in South America, Central America, and the Caribbean. Emphasis on democratization.

2439 **International Political Economy** (3) Sell, Kaplan

Analysis of the political aspects of global economic relationships, focusing on such issues as economic hegemony, interdependence, trade relations, development assistance, multinational corporations, and the role of international organizations.

2440 **Theories of International Politics** (3) Nau, Lebovic, Lynch, Talmadge

Exploration of alternative theoretical approaches to understanding world politics in its historical and contemporary dimensions.

2442 **International Organizations** (3) Finnemore

Development and operations of international organizations working in the areas of collective security, peacekeeping, trade, finance, environment, human rights.

2444 **Public International Law** (3) Staff

Survey of essential principles and concepts of public international law through case analysis and with reference to political factors.

2446 **U.S. Foreign Policy** (3) Saunders, Stein

Constitutional, political, and international factors that determine the formulation, execution, and substance of U.S. foreign policy.

2449 **International Security Politics** (3) Glaser, Grynaviski, Biddle

Overview of international security issues. Insights from a variety of historical periods and theoretical approaches inform the analysis.

2461 **European–Atlantic Relations** (3) Staff

International politics of the North Atlantic area, the European Union, and U.S.–European relations.

2468 **Post-Soviet Foreign Policy** (3) Staff

External problems and policies of Russia and the other successor states of the former USSR (especially the Baltics, Ukraine, and southern rim of the former Soviet Union).

2475 **International Relations of East Asia (3)** Mochizuki, Hughes

Analysis of the foreign policies of selected East Asian countries and the foreign policies of major powers toward the region.

2476 **The Arab–Israeli Conflict (3)** Finkel

Origins, evolution, and issues of the Arab–Israeli conflict.

2478 **International Relations of the Middle East (3)** Brown, Lynch

Analysis of the regional and international relations of the Middle East.

2482 African International Politics (3) Lambricht

Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended prerequisite: PSc 2381.

2484 **International Relations of Latin America (3)** McClintock

Emphasis on U.S. foreign policy toward Latin America.

2987 **Internship** (1 to 3) Wiley

Study of political behavior and institutions through internship experience. Open to departmental majors only. Admission requires departmental approval and junior standing.

2990	Selected Topics (3)	Staff
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2991	Special Topics in Political Thought (3)	Staff
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2992 **Special Topics in American Politics and Government (3)** Staff2993 **Special Topics in Comparative Politics (3)** Staff2994 **Special Topics in International Relations (3)** Staff

3192	Proseminar (3)	Staff
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Examination of selected problems in political science. Admission restricted to political science majors in their junior or senior year. May be repeated once for credit.

4991 **Independent Study** (1 to 3)

Staff

For departmental majors. Prerequisite: senior standing, 15 credit hours of upper-division political science courses, and approval of the undergraduate program advisor and the faculty member who will direct the study.

PORTUGUESE

See **Romance, German, and Slavic Languages and Literatures**.

PSYCHOLOGY

Professors L.A. Rothblat, R.A. Peterson, P. Wirtz, C.K. Sigelman, L.R. Offermann, P.J.

Poppen (*Chair*), E. Hirshman (*Research*), M.C. Zea, P. Barratt, G. Howe

Associate Professors L. Brandt, C.A. Rohrbeck, S. Dopkins, S.D. Molock, J.M. Ganiban,

D.P. Costanza, E. Davis, P.J. Moore, J.W. Philbeck, C. Gee, H.N. Le, A.N. Zucker, S.

Lambert, M.H. Sohn

Assistant Professors C. Beil (*Research*), D.E. Schell, M. Stock, S. Shomstein, T.L. Dodge,

L.A. Phillips, G.K. Wu

Adjunct Professor K. Ross-Kidder

Professorial Lecturer S. Forssell

Lecturers P.J. Woodruff, J. Vajda

Bachelor of Arts with a major in psychology—The following requirements must be fulfilled:

1. The general requirements stated under *Columbian College of Arts and Sciences*.
2. Prerequisite course—Psyc 1001.

3. Required courses in related areas:

(a) Stat 1053 or equivalent. Students are encouraged to take a second statistics course to meet the general curriculum requirement in quantitative and/or logical reasoning.

(b) 6 credit hours from one of the following departments: Anthropology, Economics, History, Political Science, or Sociology; an additional 3 credit hours from a different one of these departments or from American Studies, Geography, or Philosophy.

4. Required courses in the major—three survey courses (two chosen from Psyc 2011, 2012, 2013 and one from Psyc 2014, 2015); Psyc 2101 and 3106; one course designated as cognitive/biological and two courses designated as social/developmental/clinical (lists of designated courses are available at www.gwu.edu/~psycdept); and three additional courses numbered above Psyc 2101. If a grade lower than C– is received for Psyc 2101 or 3106, the course must be repeated; credit for the repetition will not count toward degree requirements. Only 3 credits of Psyc 4191 can be applied toward the major.

Special Honors—To qualify for graduation with Special Honors the student must fulfill the general requirements stated under University Regulations, submit an application to the Psychology Department before the beginning of the student's senior year, take an honors seminar (Psyc 4197) and a graduate-level seminar, and complete an independent study project (Psyc 4191 or 4198) with distinction. The grade-point average in psychology required for graduation with Special Honors is 3.5.

Combined Bachelor of Arts with a major in psychology/Master of Arts in the field of art therapy—Students interested in this dual degree program should consult the director of the Art Therapy Program early in the junior year.

Minor in psychology—18 credit hours are required, including Psyc 1001; three survey courses (two chosen from Psyc 2011, 2012, 2013 and one from Psyc 2014, 2015); and at least two additional psychology courses numbered higher than Psyc 2015 but excluding Psyc 4191 and 4198. Students considering graduate study in psychology are advised to take Psyc 3106, a distribution of courses from the categories listed under the major above, Psyc 4196, and an elementary course in statistics.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Departmental prerequisite: Psyc 1001 is prerequisite to all psychology courses.

1001 **General Psychology** (3) Staff

Fundamental principles underlying human behavior. (Fall and spring)

2011 **Abnormal Psychology** (3) Rohrbeck, Woodruff, Le, Schell, Molock

Causes, diagnosis, treatment, and theories of various types of maladjustments and mental disorders. (Fall and spring)

2012 **Social Psychology** (3) Dodge, Stock

Social foundations of behavior: cognition, motivation, role behavior, communication, small-group processes, and attitudes. (Fall and spring)

2013 **Developmental Psychology** (3) Ganiban, Gee, Sigelman

Introduction to the study of human development; theory and research concerning changes in physical, cognitive, and social functioning and influences on the developing individual. (Fall and spring)

2014 **Cognitive Psychology** (3) Philbeck, Sohn

Introduction to the study of cognition; review of data and theories on the topics of perception, attention, memory, language, reasoning, and decision making.

2015 Biological Psychology (3)

Wu

Introduction to the biological basis of behavior; review of data and empirical methods on the topics of neural structure and function, brain damage, neuro-anatomy, genes, hormones and their influence on behavior.

2101 Psychology Research Methods (3)

Moore, Zucker, Phillips

Survey of research designs (e.g., case studies, correlational designs, experiments), methods (e.g., questionnaires, observations), and measurement issues (e.g., reliability and validity). Prerequisite or corequisite: Stat 1053. (Fall and spring)

2144 Industrial/Organizational Psychology (3)

Offermann

Psychological concepts and methods applied to problems of personnel management, employee motivation and productivity, supervisory leadership, and organizational development. (Fall and spring)

2160 Group Dynamics (3)

Offermann

Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes. (Fall and spring)

3106 Principles and Methods of Psychology (4)

Dopkins, Philbeck

Lecture (3 hours), laboratory (3 hours). An experimental approach to understanding behavior; individual and class experiments performed. Laboratory fee. (Fall and spring)

3108 Humanistic Psychology (3)

Schell

Critical examination of humanistic psychology. Emphasis on role of consciousness in human behavior. Philosophic foundations, existential, phenomenological, and transpersonal psychology. (Fall)

3110 **Perception and Understanding in Children (3)** Staff

Concepts and research in the area of developmental psychology; emphasis on the growth and development of thinking, perceiving, and symbolic activity.

(Spring)

3112 **Psychology of Adolescence (3)** Ross-Kidder, Gee

Psychological characteristics and problems peculiar to adolescence, with emphasis on application of psychology to solution of such problems. Prerequisite: Psyc 2013. (Fall or spring)

3114 **Adult Development and Aging (3)** Sigelman

Psychological aging and development during the adult years, with an emphasis on theories of adult development and research on changes in cognitive functioning and social adjustment in early, middle, and later adulthood. Prerequisite: Psyc 2013.

3115 **Developmental Psychopathology (3)** Ganiban

The origins of child psychopathology, including developmental perspectives and the potential contributions of child-, family-, and community-based characteristics to the emergence of psychopathology. The development of specific childhood disorders.

3118 **Neuropsychology (3)** Rothblat

Analysis of neural processes underlying behavior. Basic structure and functions of the nervous system, with emphasis on sensory processes, learning and memory, motivation, and emotion. (Fall and spring)

3121 Memory and Cognition (3)

Philbeck, Sohn

An examination of the psychological processes underlying human memory and cognition. Topics cover theoretical and experimental issues involving a range of cognitive function from attention and pattern recognition to learning and memory. (Fall and spring)

3122 Cognitive Neuroscience (3)

Shomstein

How the structure and functions of the brain are related to cognitive processes and their associated behaviors. The biological bases of behavior and mental activity. Research and case studies by cognitive psychologists, neuroscientists, psychiatrists, and linguists, focusing on how the brain affects pattern recognition, attention, short-term and long-term memory processes, and language.

3124 Visual Perception (3)

Philbeck

An overview of human perception, ranging from the detection of simple stimuli to the identification of objects and events. Perceptions of color, motion, and spatial layout. Research methodology, biological foundations, and theoretical issues.

3125 Cross-Cultural Psychology (3)

Molock

Introduction to the theory, methods, and research of cross-cultural psychology, with emphasis on immigrants and ethnic minorities in the United States and on other cultures.

Prerequisite: Psyc 2012 or 2013.

(Spring)

3128 Health Psychology (3)

Phillips

Current research in the area of health psychology, with special attention to psychological factors related to health and illness, psychological intervention with medical

patients, and psychological approaches to illness prevention and health promotion. (Fall and spring)

3129 **Theories of Personality (3)** Staff

Survey of personality theories; emphasis on their application to problems of individuals. (Fall and spring)

3131 **Psychological Tests (3)** Ross-Kidder

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee. (Fall and spring)

3132 **Social and Personality Development (3)** Ross-Kidder, Sigelman

Examination of personal, emotional, and social development from infancy to adolescence and influences on that development.

3150 **Psychology of Sex Differences (3)** Poppen

Relevant biological, psychological, and sociological influences on males and females in the development of sex differences; hormonal differences, gender identity, differential socialization of sons and daughters, masculinity/femininity, cultural evaluation of male and female roles. Survey of relevant psychological theory. Emphasis on empirical research and hypothesis testing. (Spring)

3151 **Theory and Practice of Women's Leadership (3)** Offermann

Same as WLP 2151.

3152 **Women and Psychology (3)** Zucker

The psychology of women from a variety of perspectives (e.g., biological, cultural, social constructivist). Ways in which mainstream psychology is gendered; various feminist approaches to studying issues of gender in psychology. Same as WStu 3152. (Fall)

Staff

Staff

Poppen

Rohrbeck, Gee

Le

Lambert

The origins and current practice of community psychology, and comparison of community psychological approaches with traditional clinical perspectives. The role of psychology in addressing social issues facing communities; methods for research and intervention targeting communities.

3188 Attitudes Toward Death and Dying (3)

Woodruff

Exploration of the many different aspects, attitudes, and experiences associated with the process of death and dying. (Fall and spring)

3945 The Psychological Study of Spirituality (3)

Schell

The complex interrelationship between psychology and spirituality: health and wellness; development of a spiritual life; psychological factors involved in spirituality; therapy and multicultural issues. Same as Rel 3945. (Spring)

4191 Independent Research (1 to 3)

Staff

Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. A list of participating faculty members and their research specialties is available from the Department. May be repeated three times for credit. Prerequisite: Psyc 2101.

4192 Field Experience (3)

Staff

Senior psychology majors spend a minimum of six hours a week in a local mental health, rehabilitation, school, or community setting. Students must have weekly blocks of time available. (Fall and spring)

4193 Seminar in Industrial/Organizational Psychology (3)

Offermann

Selected specialized topics in the field of psychology and work behavior, such as human ability and personality, decisions and risk behavior, organizational change, and leadership. May be repeated for credit. Prerequisite: Psyc 2144 or permission of instructor.

4196 History and Systems of Psychology (3)

Staff

A survey and integration of the major viewpoints and concepts of psychology. Recommended for students planning graduate study.

(Fall and spring)

4197 **Honors Seminar (3)** Staff

Selected topics in psychology that change each semester. Intended primarily for students in the Special Honors program in psychology. May be repeated once for credit.

Prerequisite: Psyc 2101. (Fall and spring)

4198 **Current Research Issues (3)** Staff

Conducted as a seminar. Recent experiments in psychology, including those performed by members of the class; emphasis on student participation. May be repeated once for credit. Prerequisite: Psyc 2101.

4199 **Current Topics in Psychology (3)** Staff

Topics vary. May be repeated for credit provided the topic differs.

PUBLIC ADMINISTRATION

Programs in public administration are offered at the graduate level by the Trachtenberg

School of Public Policy and Public Administration in Columbian College of Arts and Sciences. The courses listed here are open to undergraduates.

2000–1 **Justice and the Legal System I–II (3–3)** Kasle

The structure and function of constitutional law: the Supreme Court as an institution, how its cases are decided, and effects of its decisions on the political and social life of the country. PPPA 2000 is prerequisite to PPPA 2001, which focuses on the First

Amendment. (Academic year)

2117 **Executive Branch Politics (3)** Staff

Contemporary concepts and issues in public administration and management. Major trends and approaches to governmental administration in the U.S., including the changing

federal role, roles of the public sector in relation to the private sector, and managing public agencies at all levels. Same as PSc 2217. (Fall and spring)

PUBLIC HEALTH

Undergraduate Program Committee: S. Wilensky (*Director*), C. Battle, R. Burke, J.

Catalanotti, T. Henry, K. Hunting, R. Katz, R. Riegelman, W. Schroth, J. Teitelbaum

See the School of Public Health and Health Services for the program of study leading to the

Bachelor of Science with a major in public health. The following courses are also available to undergraduates in other schools and may be used toward a secondary field in public health. Check with the SPHHS Student Services Office for any prerequisites that may apply.

1101 Introduction to Public Health and Health Services (3)

Introduction to aspects of public health and health services, including health services administration and policy, maternal and child health, environmental health, and health promotion.

1102 History of Public Health (3)

Historical and philosophical development of public health and its contributions to understanding, preventing, and controlling disease and disabilities.

2110 Public Health Biology (3)

Basic scientific mechanisms, concepts, and principles in health and the pathogenesis of diseases; a foundation for applications to public health. Prerequisite: BiSc 1005 or 1111.

2111 Introduction to Preventive Medicine (3)

Introduction to the clinical science basis of preventive medicine, including nutrition, infectious diseases, immunology, and human growth and development. Overview of the goals and methods used for disease prevention.

2112 Principles of Health Education and Health Promotion (3)

Social and behavioral theories underlying health promotion program development and evaluation. Practical applications in a variety of domestic and global public health settings. Prerequisite or corequisite: PubH 1101.

2113 Impact of Culture Upon Health (3)

Relationships between cultural values and the development of modern health systems based on Western models of health care practice. Reliance upon traditional forms of health care. Examples of successful incorporation of traditional practices into evolving health care systems.

2114 Environment, Health, and Development (3)

Survey of the relationship between health and development and environmental trends. Topics include deforestation, urban contamination, and desertification.

2115 Health, Human Rights, and Displaced Persons (3)

Concepts of health as a human right, ethics, and the participation of the international community in moving toward health for all. Civil and international conflict in the generation of displaced populations.

2116 Global Delivery of Health Systems (3)

Introduction to health systems and the basic concepts of health systems administration and financing and health care reform with examples from advanced, middle income, and poor countries.

2117 Service-Learning in Public Health (3)

Students are responsible for securing an approved service site before the beginning of the semester. See the undergraduate public health website. Prerequisite: permission of program director.

3130 Health Services Management and Economics (3)

Basics of management theory, finance, and economics as applied to managing in the public health and health services field. Prerequisite: Econ 1011.

3131 Epidemiology: Measuring Health and Disease (3)

Principles of epidemiology applied to disease surveillance, control of infectious and chronic diseases, and health services/health policy. Understanding the basic research designs and their relationship to establishing cause and effect and effectiveness of interventions to prevent and cure disease. Prerequisite: PubH 1101, Stat 1127 or equivalent.

3132 Health and Environment (3)

Introduction to environmental and occupational health and implications for individual and population health. Issues of clean water, environmental toxins, air pollution, and the environmental impact on infectious diseases.

3133 Global Health and Development (3)

Basic concepts of development theory, international health policy, demographic trends, and health promotion; how the relationships between socioeconomic development and global health can be observed, measured, and used for the management of health programs.

3134 International Public Health Practice (3)

Global challenges of new and re-emerging infectious diseases and the health of travelers. Use of health information in the context of globalization and public health practice. International aspects of medical and public health training.

3135 Health Policy (3)

An introduction to the fundamentals of the health care system in the United States and strategies available to policymakers when addressing problems relating to access, financing, and delivery of health care. Prerequisite: PubH 1101.

3136 Health Law (3)

Legal concepts related to individual health care and public health systems in the United States. Health care law, public health law, and bioethics.

3150 Sustainable Energy and Environmental Health (3)

Sustainability issues from the perspective of environmental health. Technical, social, and health implications of specific energy sources. Energy conservation and efficiency in the context of population growth, food and water resources, and maintenance of a healthy environment for future generations.

3190 Topics in Public Health (1 to 3)

Topics announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Various offerings each semester.

4140 Senior Seminar (3)

Limited to public health majors in their senior year. Students develop a public health intervention incorporating various domains of the discipline of public health.

4199 Independent Study (3)

For departmental majors only. Prerequisite: outline of intended project must be approved prior to registration by instructor and dean's office.

RELIGION

University Professor S.H. Nasr

Professors D.D. Wallace, Jr., A.J. Hildebeitel, P.B. Duff, R.J. Eisen (*Chair*)

Associate Professors X. Kang, D. Malone-France, I. Oh Koukios, K. Pemberton

Assistant Professor E. Aviv

Professorial Lecturers B.N. Hebbbar, E.C. Hostetter, M. Faghfoory, N. Houghtby-Haddon,

P. Reddy

Bachelor of Arts with a major in religion—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Rel 1001, 1002.
3. Required—33 credit hours, including Rel 3901, 4101; one course each in the Hebrew Bible and New Testament; and seven additional upper-level courses, of which at least four must be chosen from one religious tradition (such as Buddhism, Christianity, East Asian religions, Hinduism, Islam, Judaism) and at least two chosen outside that tradition.

Special Honors are awarded to students who meet the requirements stated under University Regulations, maintain a grade-point average of 3.5 in courses in the major, and receive a grade of A– or better in Rel 4101.

It is recommended that students include the study of foreign languages in their undergraduate program, including a language crucial to one of the religious traditions.

Bachelor of Arts with a major in peace studies—The following requirements must be fulfilled:

1. The general requirements of Columbian College of Arts and Sciences.
2. Two years of a single foreign language, or placement into the third year of a foreign language by examination, or one year each of two modern foreign languages. Students are encouraged to study abroad.
3. 30 credits of courses in peace studies and related fields, including PStd 1010 and 3190, plus eight courses selected from designated lists in the following categories:
philosophical and religious approaches to peace (two courses); international peace and conflict (three courses); social, economic, and environmental justice (three courses). Special Topics courses may count toward the major with approval of the peace studies director.

Minor in religion—Required: a minimum of six approved courses in religion. The minor program will be developed in consultation with the departmental advisor. Rel 3901 is strongly recommended.

Minor in peace studies—Required: 18 credit hours, including PStd 1010 and 3190 plus at least one course chosen from each of the following three categories (lists of courses that can fulfill each category are available in the Department of Religion): (1) philosophical and religious approaches to peace; (2) international peace and conflict; (3) social, economic, and environmental justice. With approval of the advisor, Topics courses and courses in the 5000s in related subjects may be counted toward the minor. An internship in a relevant agency (through CCAS 2154) may also count for 3 hours of credit, with advisor's prior approval.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

RELIGION

1001 **Introduction to World Religions: West** (3) Staff

Examination of the religions of the ancient Mediterranean and the major religions of the West. Religious foundations of Western civilizations. The development of Judaism, Christianity, and Islam and their confrontations with secularization and political upheaval in the modern world.

(Fall and spring)

1002 **Introduction to World Religions: East** (3) Staff

Examination of the major religions of the East and comparison with religions in the West. Approaches to the cross-cultural study of religion. Hinduism, Buddhism, and the religions of Tibet, China, and Japan are studied with respect to their history and their encounter with modernity.

(Fall and spring)

1009 **Bible: Hebrew Scriptures** (3) Duff

The literature, history, and religious thought represented by the Hebrew Scriptures (Old Testament). Continuities and contrasts between Israel and the ancient Near East are considered through study of the world view, oral and literary tradition, main religious ideas, and chief figures and movements of the biblical literature. (Fall and spring)

1010 **Bible: New Testament** (3) Duff

Literature and history of earliest Christianity in the setting of the religious movements of the Greco-Roman world and developments within Judaism. The meaning of the earliest Christian proclamation about the significance of the life, teaching, and death of Jesus of Nazareth becomes the basis for tracing the formation and expansion of the Christian movement.

(Fall and spring)

3141 **Second Temple/Hellenistic Judaism (3)** Duff

History of Judaism from the time of Ezra through the destruction of Jerusalem in 70 CE—canonization of the Pentateuch, Hellenism, Maccabean revolt, growth of sectarian movements, Herod, ferment against Rome in context of Eastern and Western political currents. Use of primary sources, especially the Bible, Josephus, and noncanonical writings.

3149 **Biblical Issues (3)** Duff

May be repeated for credit provided the topic differs.

3151 **Jesus (3)** Duff

Comprehensive study of the life and teachings of Jesus with critical attention to sources. Quest for the historical Jesus.

3161 **Paul (3)** Duff

Backgrounds of early Christianity, first-century religious and social conditions affecting the spread of Christianity, the life and journeys of Paul, Paul's presentation of the Christian faith.

3165 **Canonical Gospels (3)** Duff

Study of the four canonical gospels (traditionally those of Matthew, Mark, Luke, and John) in terms of each presenting a distinct literary portrait of Jesus of Nazareth and each

being the product of a religious community that shared at least some beliefs and practices with surrounding “pagan” and Jewish communities.

3169 **Lost Gospels (3)**

Duff

Examination of some of the gospels not included in the Christian canon. These include, among others, Q, the Gospel of Thomas, the Gospel of Mary, and the Gospel of Judas. These lost gospels provide a fresh perspective on the development and diversity of early Christianity.

3175 **Zoroastrianism (3)**

Hebbar

Study of the ancient religion of pre-Islamic Iran. Pre-Zoroaster Avestan religion, life of Zoroaster, theology, rites, and history of Zoroastrianism, Zoroastrian variants such as Mithraism and Manichaeism, and the Zoroastrian encounter with Judaism, Christianity, and Islam.

3201 **Judaism (3)**

Eisen

A survey of Jewish thought and practice from the biblical to the modern period; introduction to the Hebrew Bible, rabbinic Judaism, Jewish philosophy and mysticism, Judaism in the modern period; an examination of the central rituals in Judaism, including Sabbath, dietary laws, and major festivals. (Fall)

3211 **Rabbinic Thought and Literature (3)**

Eisen

The thought-world of rabbinic Judaism in its formative period, 100–500 CE, through a close reading of primary texts in translation selected from Mishnah, Talmud, and Midrash. Topics include Oral Torah, the mechanics of rabbinic law, conceptions of God, views on suffering. The influence of rabbinic Judaism on modern Jewish ethics and thought.

3221 **Issues in Jewish Ethics (3)**

Staff

Exploration of current debates about major ethical issues among Jewish thinkers in the Orthodox, Conservative, and Reform denominations; issues in bioethics, feminism, attitudes towards non-Jews, social action, the ethics of war.

3231 **Jewish Mysticism (3)**

Eisen

A historical treatment of the major forms of Jewish mysticism: the ecstatic schools of Merkavah mysticism, medieval German pietism, and Abraham Abulafia; the theosophic mysticism of medieval French and Spanish Kabbalah, Lurianic Kabbalah, and modern Hasidism; examination of major concepts, such as God, man, Israel, Torah, and redemption, as understood by these schools.

3281 **Women in Judaism (3)**

Staff

Jewish women's spirituality as reflected in personal writings, ritual, liturgy, and midrash. Jewish women's history and legal status. Same as WStu 3281.

3291 **Modern Jewish Thought (3)**

Eisen

Jewish thought from 1800 to the present through an exploration of six preeminent Jewish theologians: Moses Mendelssohn, Hermann Cohen, Martin Buber, A.J. Heschel, J.B. Soloveitchik, and Mordecai Kaplan. The relationship between these thinkers and the major Jewish denominations: Orthodox, Conservative, Reform, and Reconstructionist.

3314 **Contemporary Philosophy of Religion (3)**

Malone-France

Consideration of major lines of inquiry and approaches in philosophy of religion through study of some of the major figures in several contemporary schools of thought within the field.

3321 **Christian Ethics and Modern Society (3)**

Oh Koukios

Nature and principles of Christian life as developed by the Christian community; problems of personal conduct; application to various social institutions.

3341 **Christianity in the Ancient World** (3) Wallace

Rise and development of Christianity in relation to the culture, philosophy, mystery religions, and general religious life of the Greco-Roman world to A.D. 500.

3342 **Medieval Faith and Symbolism** (3) Wallace

Christian life and thought in the Middle Ages; mystics, saints, popes, and philosophers.

3343 **Religion in the Renaissance and Reformation** (3) Wallace

Transformation of the Western understanding of human identity and destiny from the end of the Middle Ages to the Age of Reason.

3344 **Christianity in the Modern World** (3) Wallace

Changes in Christian life and thought since 1700, as seen in theology, literature, political life, and religious institutions.

3401 **Islam** (3) Nasr

Origin, development, and contemporary status of Islamic life and thought; its impact on the Near East.

3414 **Islamic Philosophy and Theology** (3) Nasr

The major schools of Islamic philosophy and theology, considered in both a morphological and historical manner. The relation between revelation and reason, determination and free will, and divine and human knowledge as well as the relation among science, philosophy, and religion. The development of various schools of thought, from the classical period to the present.

3431 **Sufism (Islamic Mysticism) (3)**

Nasr

The foundation of Sufism in the Quranic revelation, its subsequent development, and its significance within Islamic civilization. Doctrines and practices of Sufism; history of the Sufi orders; Sufi literature, particularly in Arabic and Persian. The influence of Sufism upon social and political life and its state and role in the contemporary world, both Islamic and non-Islamic.

3475 **Islamic Religion and Art (3)**

Nasr

Investigation of major forms of Islamic art, such as calligraphy, architecture, and urban design; Quranic chanting, poetry, and music in relation to the principles of Islamic revelation. Same as AH 4119.

3481 **Women in Islam (3)**

Pemberton

The ways in which Islam has articulated gender identity and male–female relationships, and conversely, how women have constructed, interpreted, and articulated Islam and their places within it. Same as WStu 3481.

3482 **Gender and Piety in Islam (3)**

Pemberton

Issues related to gender, sainthood, and piety in Islam. Reading of classical primary texts and historical, ethnographic, and philosophical works. Focus on mysticism and metaphysics in Sufi and Shi'i traditions. Final projects are creative or research oriented.

3501 **Hinduism (3)**

Hiltebeitel

Study of continuity and change in Hinduism, with emphasis on historical development and the consolidating features of the religion. Attention to relations between classical and popular living forms.

3506 **Religion, Myth, and Magic (3)**

Staff

Same as Anth 3505.

3514 **Indian Philosophy and Mysticism (3)** Hiltebeitel

Indian speculative and mystical traditions; late *Vedas*, *Upanishads*,
Bhagavad Gita, Buddhist, and Hindu soteriological systems.

3562 **Mythologies of India (3)** Hiltebeitel

The lore of Indian gods (Vedic, Puranic), heroes (epics), and holy men (Hindu,
Buddhist, Jain, Tantric); ties with Indian art, caste, cult, cosmology, and spiritual ideals.

3566 **Dharma in Hinduism and Buddhism (3)** Hiltebeitel

Development of working definitions of dharma as it is used in law, religion, ethics,
and narrative in Buddhist and Brahmanical/Hindu texts of India's classical period.

3601 **Buddhism (3)** Aviv

Origin, development, and contemporary status of Buddhist life and thought; its impact
on Asia.

3611 **South Asian Buddhism (3)** Hebbat

The life of Buddha, the Buddhist Councils, doctrines of the schools of Hinayana
Buddhism, philosophies of the schools of Indian Mahayana Buddhism, history of Buddhism
in Sri Lanka, early history of Tibetan Buddhism, and the decline of Buddhism in India.

3614 **Buddhist Philosophy (3)** Aviv

The key terms, fundamental concepts, major schools of thought, and leading thinkers
of the Buddhist philosophical tradition.

3701 **Religion in the United States (3)** Wallace

Growth of religious groups and institutions in relation to American culture,
development of religious thought, and analysis of the contemporary religious scene.

3711 **Religion in Contemporary America (3)**

Wallace

Trends and currents in American religion in the past fifty years. The nature and meaning of religious pluralism in the United States.

3732 **American Judaism (3)**

Staff

Religious thought and institutions with emphasis on contemporary Judaism. Mythic and ritual life of American Jews, including responses to Israel, diaspora, the Holocaust, family and community dynamics.

3811 **Confucian Literature in East Asia (3)**

Kang

General introduction to the Confucian traditions of literature, with an emphasis on history, historical writings, popular tales, and drama in China, Japan, and Korea. Same as EALL 3811.

3814 **Religion and Philosophy in East Asia (3)**

Aviv, Kang

General introduction to the religions and philosophical tradition of China, Japan, and Korea. Same as EALL 3814.

3821 **Religion and Ethics in East Asia (3)**

Staff

Introduction to the foundational traditions of ethics in China, Japan, and Korea, with an emphasis on their early origins and transformation in pre-modern and contemporary times. Same as EALL 3821.

3831 **Daoism in East Asia (3)**

Kang

Study of the early history of the formation and development of Daoism, its growth into an institutionalized religious organization in China, and its role in the religious and philosophical history of Japan and Korea. Same as EALL 3831.

3832 **Myth, Ritual, and Popular Religion in China (3)**

Kang

Key aspects of popular religious myths, symbols, rituals, and practices in China, such as ancestor worship, spirit possession, *fengshui* theories, and pilgrimage.

3841 **Religion in Modern China (3)** Kang

The changes, destructions, and reconstructions of Chinese religions from the late 19th century to the present day. The relationship between the (re)making of Chinese religions and the making of a modern Chinese nation-state. Same as Chin 3841.

3881 **Women, Gender, and Religion in China (3)** Kang

A historical introduction to the concepts of body, gender, and womanhood in Confucian, Daoist, Buddhist, and popular Chinese religious traditions. Women's roles in religious ritual and practices; the influence of Christianity and modernity. Same as WStu 3881.

3891 **Shintoism (3)** Hebbar

The history of Shintoism, the folk religion of Japan, from mythical antiquity to the post-World-War-II era. Interactions with Confucianism and Buddhism. Shinto mythology, Shrines, and festivals. Sectarian Shinto, ideological Shinto, and state Shinto included.

3901 **Theories and Methods in the Study of Religion (3)** Staff

Seminar taught jointly by the faculty of the Department of Religion. Analysis of different ways in which religious phenomena can be approached. Readings and discussion of some of the epoch-making books in the development of the study of religion. (Fall)

3911 **The Minor Religions of India (3)** Hebbar

The history, doctrines, and practices of Zoroastrianism, Jainism, Indian Judaism, Indian Christianity (Nestorian, Jacobite, Catholic, and Protestant), Indian Islam, and Sikhism.

3915 Islam and Hinduism in South Asia (3)

Pemberton

Investigation of the historical development and contemporary practice of Islam in South Asia (India, Nepal, Pakistan, Bangladesh, and Afghanistan). Particular attention to devotional traditions within Sufism and Bhakti Hinduism.

3921 The Religions Wage Peace (3)

Oh Koukios

Resources in various world religions that contribute to peacemaking in both interpersonal and political settings. Ways in which the religions have sponsored and/or tolerated violence.

3922 Ethics and the World Religions (3)

Oh Koukios

Modern concepts of ethics and their relation to major world religions; religion as stimulus and barrier to moral change; modern moral issues and religious ethics.

3923 Violence and Peace in Judaism, Christianity, and Islam (3)

Eisen

Historical analysis of the violent and peaceful dimensions of the three Abrahamic faiths, with focus on the relationship of the scriptures of each of the three traditions to the later interpretations that supported both violent and peaceful readings of those texts.

3931 Doctrine and Debate in World Religions (3)

Hebbar

Comparison of certain families of religions and the doctrinal debates in which they have engaged, including Hindu–Buddhist, inter-Hindu, inter-Buddhist, Buddhist–Confucian, Jewish–Christian, inter-Christian (Catholic–Protestant), Christian–Islamic, and inter-Islamic debates.

3945 **The Psychological Study of Spirituality (3)** Staff

Same as Psyc 3945.

3951 **Myth, Epic, and Novel (3)** Hiltebeitel

Religious themes and images of the hero and their cultural significance in literature:
e.g., Indo-European, Biblical, Babylonian narrative traditions; Greek epic and drama;
Dante, Milton, Dostoevsky, Kafka, Hesse, Faulkner, Beckett.

3981 **Women in Western Religion (3)** Staff

Historical, theological, and ethical investigation of the image and role of women in
Judaism and Christianity; special consideration of the Biblical experience, the sexual
qualifications for religious office, use of male and female images and languages, and
contemporary issues. Same as WStu 3981.

3989 **The Goddess in India and Beyond (3)** Hiltebeitel

The goddess traditions of Hinduism, with some attention to goddess traditions in the
ancient Near East and the Mediterranean. Classical Sanskrit, Tantric, and popular
expressions of Hindu goddess worship. Comparative studies and issues of gender.

3990 **Selected Topics (3)** Staff

Critical examination of religious phenomena rendered timely by current
events or special resources. Topic announced in the Schedule of Classes.
May be repeated for credit provided the topic differs.

4101 **Senior Capstone Seminar (3)** Staff

Required of and open to students majoring in religion. (Fall and spring)

PEACE STUDIES

1010 **Introduction to Peace Studies and Conflict Resolution (3)** Oh Koukios

Major thinkers and themes in the field of peace studies and conflict resolution. Focus on philosophical and religious foundations of peace and justice movements in the 20th century. Examination of peace and conflict through an interdisciplinary lens and on personal, local, and international levels.

3190 Peace Studies Project (3)

Oh Koukios

Capstone seminar for peace studies minors in their junior or senior year. Taken concurrently with a relevant internship or as part of a long-term research project to probe the relationship between peace studies and conflict resolution in practice and in theory.

3191 Special Topics in Peace Studies (3)

Staff

Topics announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

ROMANCE, GERMAN, AND SLAVIC LANGUAGES AND LITERATURES

Professors P. Rollberg, R. Robin, S. Waisman (*Chair*)

Associate Professors G.P. Huvé, Y. Captain, I.R. Vergara, C. Britt, M.R. Gonglewski, M.B.

Stein, M. Belenky, L. Chang, D.B. Marshall (*Teaching*), M. de la Fuente

Assistant Professors J. Brant, G. Shatalina, L.L. Westwater, J. Marroquin, P. Granja-Falconi (*Teaching*), K. Kleppinger

Instructors A. Serrano-Ripoll, B. Cobeta (*Teaching*), M. Moreno (*Teaching*)

Bachelor of Arts with a major in French language, literature, and culture—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Fren 1001, 1002, 1003, 1004, 2005.

3. Required for the major—30 credit hours, including Fren 3100, 4910–20, and seven additional upper-division courses numbered 2006 and above, of which four must be in French literature and culture and, with approval of the major advisor, two may be in a related field. Two of the six additional courses must be from the French 4000 series.

Bachelor of Arts with a major in Spanish and Latin American languages, literatures, and cultures—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Span 1001, 1002 (or 1012), 1003, 1004 (or 1034), 2005, 2006 (or 2056), 3010, 3100. Note: Students who start study toward the major with prerequisite language study are cautioned to take the intensive language courses—Span 1012, 1034, and 2056—in order to complete the major in a timely manner.

3. Required for the major—36 credit hours, including Span 3210–20, 4910–20, and eight additional courses at the 3000–4000 level that must include two literature courses before 1800 and two since 1800. With approval of the advisor, two of the eight courses may be taken from outside the department. At least eight of the twelve courses that constitute the major must be taken at GW.

Bachelor of Arts with a major in German language and literature—The following requirements must be fulfilled.

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Ger 1005–6 (or Ger 1001–2, 1003–4).
3. Required courses in the major—Ger 2009–10, 2109–10; two courses chosen from Ger 2091–92 or 2161–62; two courses chosen from Ger 2111, 2161–62 (if not taken above), 2165, or the 3180s series; four courses chosen from the Ger 4170s series.

Bachelor of Arts with a major in Russian language and literature—The following requirements must be fulfilled.

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Slav 1012–1034 (or Slav 1001–2, 1003–4) and Slav 1391–92.
3. Required courses in the major—Slav 2005–6, 2007–8, 2361, and 2362; two courses chosen from Slav 2471, 2472, 2473, 2474; two courses chosen from Slav 2365, 2366, 2785, 2786.

Proficiency requirements for the Russian major: By the end of Slav 2006, students consult their advisor to choose one of the following two proficiency tracks. (1) Emphasis on proficiency in speaking—students choosing this track must attain speaking proficiency at the Intermediate High level, as measured by the ACTFL Oral Proficiency Interview; a semester of intensive language study in Russia on an approved program is required unless waived by the department. (2) Emphasis on proficiency in reading—students choosing this track must attain reading proficiency at the Advanced level on the ACTFL scale, as measured by a departmental examination; Slav 2015–16 is required, unless waived by the department.

Special Honors in French or in Spanish and Latin American languages, literatures, and cultures—In addition to the general requirements stated under University Regulations, a candidate for special honors in French or in Spanish and Latin American languages, literatures, and cultures must have attained a 3.75 GPA in the major and at least a 3.0 average overall. Qualified students may be invited to write an honors thesis by their major advisor and proseminar professor by the beginning of the fall semester of the senior year.

Special Honors in German or Russian languages and literatures—In addition to the general requirements stated under University Regulations, a candidate for special honors must have attained a 3.5 grade-point average in the major and at least a 3.0 average overall. Students must apply for honors candidacy by the end of the first semester of the junior year, must attain speaking proficiency at the Advanced level, as measured by the ACTFL Oral Proficiency Interview, and must successfully complete an honors thesis (Ger or Slav 4197–98).

Minor in French language, literature, and culture—Required: 21 credit hours consisting of Fren 2005, 2006, 3100, 3210, 3220, and two additional courses from the Fren 3000s and 4000s. Students who place out of Fren 2005 or 2006 substitute more advanced literature courses; others may substitute more advanced literature courses with permission of the advisor.

Minor in Italian language and literature—Required: 21 credit hours consisting of Ital 2005, 2006, and five additional courses chosen from Ital 3100 and above.

Minor in German language and literature—Ger 1001–2, 1003–4 (or 1005–6); Ger 2009–10 (or 2101–2); two courses chosen from Ger 2091–92, 2109–10, or 2161–62; two additional upper-division German courses (excluding Ger 2101–2).

Minor in Russian language and literature—Slav 1001–2 and 1003–4 (or 1012–1034), 2005–6 (or 2015–16), and four courses chosen from Slav 1391–92 and 2361 through 2786.

Minor in Spanish and Latin American languages, literatures, and cultures—21 credit hours consisting of three courses from Span 2005–3040; Span 3100 and either 3210 or 3220 and two additional courses (excluding Span 3300) from the Span 3000s and 4000s. At least four courses counted toward the minor must be taken at GW.

Placement examinations: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

Note: In general, Romance language courses are conducted entirely in the language concerned. Aural comprehension, speaking, reading, and writing are the basis of all courses through Fren/Ital/Port/Span 2006, with culture integrated from the start as an essential dimension of language acquisition.

FRENCH

1001 **Basic French I (4)** Marshall and Staff

Handling the immediate context of daily experience in spoken and written French: identifying, describing, and characterizing people, objects, places, and events; giving information and instructions; issuing simple commands and requests. Laboratory fee. (Fall, spring, and summer)

1002 **Basic French II (4)** Marshall and Staff

Speaking and writing in French about past and future events: telling a story (narrating and describing in the past), promising, predicting, and proposing simple hypotheses and conjectures. Prerequisite: Fren 1001 or equivalent. Laboratory fee. (Fall, spring, and summer)

1003 **Intermediate French I (3)** Marshall and Staff

Increasing active vocabulary, reinforcing mastery of basic grammar, dealing with more complex structures (verbal phrases, subordinate clauses), and using some patterns of

indirect speech (e.g., repeating or relaying messages, giving reports, summarizing).

Prerequisite: Fren 1002 or equivalent. Laboratory fee. (Fall, spring, and summer)

1004 Intermediate French II (3) Marshall and Staff

Consolidation and further expansion of the ability to understand as well as produce a more complex level of oral and written discourse emphasizing subjective expression: issuing indirect commands and requests; giving opinions; making proposals, building arguments; defending and criticizing ideas. Prerequisite: Fren 1003 or equivalent.

Laboratory fee.

(Fall, spring, and summer)

1006–7 GW Paris Program: French language and Culture I–II (3–3) Staff

Offered through the GW Paris Business Studies Program.

2005 Language, Culture, and Society I (3) Marshall and Staff

Development of strong conversational skills and the rudiments of expository writing. The vocabulary and structures necessary to move from handling everyday experience and subjective expression to the exposition of more abstract thought and ideas and discussion of political, social, and cultural issues. Prerequisite: Fren 1004. Laboratory fee. (Fall, spring, and summer)

2006 Language, Culture, and Society II (3) Marshall and Staff

Continued expansion of the range and complexity of conversational skills and further development of the writing of effective expository prose on a broad range of contemporary subjects. Short texts serve as the basis for oral discussion, analytical reading, and writing brief critical essays. Prerequisite: Fren 2005. Laboratory fee. (Fall, spring, and summer)

2049 French for Graduate Students (0) Staff

For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours.

(Fall, spring, and summer)

3010 **Advanced French Grammar and Style (3)** Brant and Staff

Composition, drills, dictations. Translations into French. Study of vocabulary and syntax, with emphasis on stylistic devices. Prerequisite: Fren 2006.

(Fall)

3020 **Contemporary France (3)** Huvé and Staff

Emphasis on advanced oral work. Discussion of French culture and civilization, based on contemporary writings and video documents. Prerequisite: Fren 2006. Laboratory fee. (Fall)

3030 **Business and Commercial French (3)** Huvé

Structure and language of French economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Preparation for the certificate of the Paris Chamber of Commerce. Prerequisite: Fren 2006. (Spring)

3100 **Introduction to French Literature (3)** Belenky, Brant, Chang

Readings, textual analysis, and writing on a broad selection of texts from different genres and periods. French and Francophone literatures in their cultural contexts. Close reading approach and introduction to literary vocabulary. Prerequisite: Fren 2006. (Fall and spring)

The French courses that follow (excluding Fren 3300) have a prerequisite of Fren 3100 or permission of the instructor.

3210 Medieval and Early Modern French

Chang and Staff

Literature in Context (3)

Texts of the Middle Ages to the 17th century studied in their historical, social, and cultural contexts. Topics may include feudal society and the literature of courtly love; humanism, Rabelais, and Renaissance poetry; women and salon writing; Versailles, absolutism, and classical theater. (Fall)

3220 Modern French Literature in Context (3)

Belenky

Texts of the 18th century to the present in historical, social, and cultural contexts. Topics may include *philosophes* and the rise of social consciousness; the French Revolution and Romanticism; dada and surrealism; existentialism and World War II; decolonization and francophone literature. (Spring)

3290 Textual Analysis (3)

Staff

Methodology and vocabulary of literary criticism. Application of various principles of textual analysis and critical approaches to literature. (Spring)

3300 Topics in French and Francophone

Belenky, Chang

Literatures and Cultures in Translation (3)

Dynamics of French-speaking societies and their cultures studied through literature, art, or film. Topics vary. Readings and lectures in English. The course may be repeated for credit. A laboratory fee may be required. (Spring)

3400 Studies in Genre (3)

Chang, Belenky

Study in narrative, dramatic, or lyric form. Topics vary. May be repeated for credit. (Spring)

3520	The Age of Classicism (3)	Staff
	Drama, philosophy, criticism, poetry, and fiction of the 17th century. Topics may include <i>préciosité</i> , baroque, Jansenism, classicism, and rationalism in the context of the major social, political, and religious movements of the period. (Spring, alternate years)	
3530	The Age of Enlightenment (3)	Staff
	The major novelists, dramatists, and <i>philosophes</i> of the 18th century. The works of Montesquieu, Voltaire, Rousseau, and Diderot and their relationship to the social, political, and philosophical thought of the period. (Fall, alternate years)	
3550	Studies in 20th-Century French Literature (3)	Staff
	Major literary movements of the 20th century: avant-garde, surrealism, existentialism, <i>nouveau roman</i> , and <i>nouveau théâtre</i> . (Spring)	
3560	Topics in 20th-Century Francophone Literature and Cinema (3)	Staff
	Analysis of relations between France and its former colonies as manifested in the literature and cinema of France and the Francophone world. Race and gender relations; exile; nationalism; and identity and place as seen through various literary and cinematic responses to the discourses of metropolitan France by its former colonies. Laboratory fee. (Fall)	
3600	Special Topics in French Literature (3–3)	Staff
–4600	May be repeated for credit provided the topic differs.	
3700	Topics in the History of French Cinema (3)	Staff

French cinema from its inception to the “New Wave.” The relationship of filmmaking and audience reception to the evolution of French society and political institutions. The language of cinema as it evolves according to periods and genres and as critics and filmmakers create a theoretical discourse specific to film. Laboratory fee. (Spring)

4135 **Folger Seminar** (3) Staff

Same as Engl/Hist 4135.

4470 **Writing Women** (3) Belenky, Chang

Dynamics of gender in French literature and culture with emphasis on women as agents and objects of representation. Gender roles in the formation of social biases, norms, and power structures. Texts range from the Middle Ages to the present. (Spring)

4500 **Studies in Medieval French Literature** (3) Chang

Readings and analysis of the major literary texts from the 11th through 15th centuries. Chansons de geste, courtly literature, fabliaux, drama, lyric and didactic poetry.

4510 **French Literature of the Renaissance** (3) Chang

Sixteenth-century prose and poetry in the context of cultural and historical movements. Topics may include humanism; concepts of self and subjectivity; the wars of religion; the discovery of the New World; court and city life; the private and public spheres; religious and secular love.

(Fall, alternate years)

4540 **19th-Century French Literature and Culture** (3) Belenky

Key aspects of 19th-century French literature in its historical, cultural, and political context. Major authors and literary movements are studied through the lens of a particular theme, which varies from year to year. (Fall, alternate years)

4800 **Independent Study** (arr.) Staff

Admission by permission of department chair and instructor. May be repeated for credit.

4910–20 **Proseminar** (3–3) Chang

Required of all majors; preparation of the senior essay. The specified topic in the history of French literature varies by year. (Academic year)

GERMAN

1001–2 **First-Year Basic German** (4–4) Gonglewski and Staff

First part of beginning course in fundamentals of speaking, understanding, reading, and writing German. Prerequisite to Ger 1002: Ger 1001. Laboratory fee. (Academic year)

1003–4 **Second-Year Basic German** (4–4) Gonglewski and Staff

Second half of beginning course in fundamentals of speaking, understanding, reading, and writing German. Prerequisite to Ger 1003: Ger 1002 or equivalent. Prerequisite to Ger 1004: Ger 1003. Laboratory fee.

(Academic year)

1005–6 **Intensive Basic German** (8–8) Gonglewski and Staff

Beginning intensive course in fundamentals of speaking, understanding, reading, and writing German (equivalent to Ger 1001–2 and 1003–4). Recommended for majors.

Prerequisite to Ger 1006: Ger 1002 or 1005 or equivalent. Laboratory fee. (Academic year)

2009–10 **Intermediate German** (3–3) Staff

Practice in speaking, listening, reading, and writing at the intermediate level.

Prerequisite: Ger 1004 or 1006 or permission of instructor.

(Academic year)

2091–92 **Introduction to German Literature—in English (3–3)** Stein and Staff

Ger 2091: Survey of German literature 1700–1830, including the

Enlightenment through *Sturm und Drang*, classicism, and romanticism. Ger

2092: Survey of German literature 1830–1950, including Young Germany

through realism, naturalism, expressionism, and the literature of the Third

Reich years (exile literature and inner emigration). (Academic year)

2101–2 **Readings in Contemporary German (3–3)** Staff

Analysis of representative readings of expository prose from German newspapers, periodicals, and other publications. Prerequisite: for Ger 2101, Ger 1004 or 1006 or equivalent; for Ger 2102, Ger 2101. (Academic year)

2109–10 **Introduction to German Studies (3–3)** Stein and Staff

An introduction to approaches, concepts, and analytical tools for study in the field, complemented by advanced practice in speaking, listening, reading, and writing.

Prerequisite: Ger 2010 or permission of instructor.

(Academic year)

2111 **Business German (3)** Gonglewski

Introductory course preparing students to function in business-related communicative situations, with an emphasis on language skills necessary for work in areas such as marketing and finance. Prerequisite: Ger 2010 or permission of instructor. (Spring)

2161–62 **German Culture—in English (3–3)** Stein and Staff

The central problems, issues, and events that have shaped the development of German culture from antiquity to the present. Emphasis on products and processes of German culture in social, historical, and political contexts.

(Academic year)

2165 **20th-Century German Literature—in English (3)** Stein and Staff

Survey of the major trends in the works by modernist, exile, postwar, and contemporary German writers such as Kafka, Thomas Mann, Duerrenmatt, and Grass. (Fall)

3181 **History of German Cinema—in English (3)** Rollberg and Staff

A detailed historical and cultural survey of German cinema from the first moving picture devices (1895) to the expressionistic classics of the 1920s and the collapse of the Nazi film industry in 1945. All films are subtitled.

3182 **The Fairy Tale from the Grimms to Disney—in English (3)** Stein

Survey of the changing form, structure, and meaning of the fairy tale in its traditional contexts, modern transformations and critical interpretations, with readings by 19th-century European collectors and 20th-century critics.

3183 **Berlin Before and After the Wall—in English (3)** Stein

The political, social, and cultural developments in Berlin from 1945 to the present through a reading of selected primary documents, historical analyses, and short literary texts.

3184 **German Thought—in English (3)** Staff

An overview of German ideas about culture, religion, society, and politics from the 16th century to the present. Readings from such writers as Luther, Leibniz, Kant, Schiller, Hegel, Marx, Nietzsche, Freud, Weber, Heidegger, Adorno, and Habermas.

3185 **Literary Voices and the Fascist Experience—in English** (3) Stein

A survey of writers anticipating as well as reflecting on Germany's plunge into the totalitarian abyss of fascist politics, including H. Mann, Kafka, Juenger, Brecht, Werfel, Thomas Mann, Lenz, Frisch, Duerrenmatt, and various forms of Holocaust poetry.

3186 **German Women Writers of the 19th and 20th Centuries** (3) Staff

The changing literary and social roles of German women of the 19th and 20th centuries, examined through selected readings of women's literary production and culture.

3187 **German Cinema After 1945** (3) Stein

The evolution of German cinema, from postwar examinations of the Nazi period through the social and political developments in the two German states. National and international influences; filmic treatments of the two German pasts since unification.

3188 **The Lives of East Germans** (3) Stein

Consideration of what it meant to grow up and live in the German Democratic Republic and the changes and challenges to East German identity since unification. The course draws upon historical, political, and sociological studies as well as literary and filmic representations of East German experience.

German courses in the 4170s have a prerequisite of Ger 2109 or 2110.

4171 **The Age of Goethe—in German** (3) Staff

Readings of major works of Weimar classicism in their historical and cultural context.

4172 **From Romanticism to Realism—in German** (3) Stein and Staff

Readings in German romanticism, literature of the “young Germany” movement (Heine), and realism (Fontane, Storm).

4173 **From Naturalism to Expressionism—in German (3)** Stein

Study of various literary movements between 1880 and 1914: naturalism, impressionism, symbolism, and expressionism (Hauptmann, Hesse, Thomas Mann, Kafka).

4174 **Inside and Outside the Third Reich—in German (3)** Stein

Analysis of literary developments inside the Nazi state (propaganda literature, literature of resistance, and inner immigration) and the literature of exile (Seghers, Remarque).

4175 **Literature of Two Germanies—in German (3)** Stein

Evolution of East and West German literatures after World War II, their separate developments and ultimate unification.

4176 **Contemporary German Literature (3)** Stein

Analysis of works by former East and West German writers after unification as well as the generation of young German writers, who came of age after or around the time of unification. Emphasis on memoirs, family narratives, essays, and films examining Germany’s transition from fascism and socialism to democracy.

4195 **Special Topics (3)** Staff

May be repeated for credit provided the topic differs.

4197–98 **Senior Honors Thesis (3–3)** Staff

Senior honors thesis on a topic related to German language, literature, or culture. Required of and open only to honors candidates in the department.

(Academic year)

ITALIAN

1001 **Basic Italian I (4)** Staff

Handling the immediate context of daily experience in spoken and written Italian: identifying, describing, and characterizing people, objects, places, and events; giving information and instructions; issuing simple commands and requests. Laboratory fee. (Fall and spring)

1002 **Basic Italian II (4)** Staff

Speaking and writing in Italian about past and future events: telling a story (narrating and describing in the past), promising, predicting, and proposing simple hypotheses and conjectures. Prerequisite: Ital 1001 or equivalent. Laboratory fee. (Fall and spring)

1003 **Intermediate Italian I (3)** Staff

Increasing active vocabulary, reinforcing mastery of basic grammar, dealing with more complex structures (verbal phrases, subordinate clauses), and using some patterns of indirect speech (repeating or relaying messages, giving reports, summarizing). Prerequisite: Ital 1002 or equivalent. Laboratory fee. (Fall and spring)

1004 **Intermediate Italian II (3)** Staff

Consolidation and further expansion of the ability to understand as well as produce a more complex level of oral and written discourse emphasizing subjective expression: issuing indirect commands and requests; giving opinions; making proposals, building arguments; defending and criticizing ideas. Prerequisite: Ital 1003 or equivalent. Laboratory fee.

(Fall and spring)

2005 **Language, Culture, and Society I (3)** Staff

Development of strong conversational skills and the rudiments of expository writing. The vocabulary and structures necessary to move from handling everyday experience and subjective expression to the exposition of more abstract thought and ideas and discussion of political, social, and cultural issues. Prerequisite: Ital 1004. Laboratory fee.

2006 **Language, Culture, and Society II (3)** Staff

Continued expansion of the range and complexity of conversational skills and further development of the writing of effective expository prose on a broad range of subjects. Short literary texts serve as the basis for oral discussion, analytical reading, and writing brief critical essays. Prerequisite: Ital 2005. Laboratory fee.

3010 **Advanced Italian Grammar and Style (3)** Staff

Compositions, drills, dictations. Translations into Italian. Study of vocabulary and syntax with emphasis on stylistic devices. Prerequisite: Ital 2006. (Fall)

3100 **Introduction to Italian Literature (3)** Westwater

Readings, textual analysis, and writing on a broad selection of texts from different genres and periods. Emphasis on study of Italian literature in its cultural context. Close reading approach and introduction to literary vocabulary. Prerequisite: Ital 2006 or equivalent. (Fall)

3201 **History of Italian Literature from the
Middle Ages Through the 17th Century (3)** Westwater

Lecture and discussion in Italian. Development of genre and movements. Selected readings across these periods plus reading of complete texts of epics, essays, novels, and plays. Prerequisite: Ital 2006 or equivalent. (Fall)

3202 History of Italian Literature from the 18th

Westwater

Through the 20th Century (3)

Lecture and discussion in Italian. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Ital 2006 or equivalent.

(Spring)

3290 Textual Analysis (3)

Westwater

Close examination of critical methods and vocabulary used in literary study as applied to Italian Literature. Attention to linguistic and stylistic difficulties in textual analysis.

Prerequisite: Ital 3100 or equivalent. (Spring)

3300 Italian Literature and Culture in Translation (3)

Westwater

Dynamics of Italian-speaking societies and their cultures studied through literature, art, or film. Topics vary. Readings and lectures in English. The course may be repeated for credit. A laboratory fee may be required. (Fall)

3600 Special Topics in Italian Literature and Culture (3) Westwater and Staff

May be repeated for credit provided the topic differs.

4131 Topics in Modern Italian Literature (3)

Westwater

Key aspects of modern Italian literature in historical, cultural, and political context. Major authors and literary movements studied in terms of a particular theme that may vary from year to year. Prerequisite: Ital 3100 or equivalent.

4183 History of Italian Film (3)

Westwater

Study of Italian films, directors, and styles, with films examined as aesthetic objects in their own right and in relation to the wider social and cultural environment. The verbal and

visual language necessary for decoding and describing film. The course is conducted in English.

4380 Italian Journeys Medieval to Postmodern (3) Westwater

Italy's dual role as the home of legendary travelers and the destination for an endless stream of tourists. The reality and metaphor of travel viewed through travel diaries, ship logs, letters to patrons, maps, travel guides, poetry, and film.

4500 Studies in Medieval and Early Renaissance Literature (3) Westwater

Works by Dante, Petrarca, and Boccaccio. Emphasis on structure, rhetorical features, and problems of narrative organization. Specific attention to historical and ideological aspects of the works as well as to cultural influence. Prerequisite: Ital 3290 or equivalent.

4560 The Italian Novel (3) Westwater and Staff

A reading of the most important Italian novelists of the 19th and the 20th centuries: Manzoni, Verga, Bassani, Calvino, Eco, Sanguinetti. Study of the relations of each work to its social and cultural context and to the novel as a genre. Prerequisite: Ital 3290 or equivalent.

4800 Independent Study (arr.) Staff

Admission by permission of department chair and instructor. May be repeated for credit.

PORTUGUESE

1001 Basic Portuguese I (4) Staff

Handling the immediate context of daily experience in spoken and written Portuguese: identifying, describing, and characterizing people, objects, places, and events; giving

information and instructions; issuing simple commands and requests. Laboratory fee. (Fall)

1002 **Basic Portuguese II (4)** Staff

Speaking and writing in Portuguese about past and future events: telling a story (narrating and describing in the past), promising, predicting, and proposing simple hypotheses and conjectures. Prerequisite: Port 1001 or equivalent. Laboratory fee. (Spring)

1003 **Intermediate Portuguese I (3)** Staff

Increasing active vocabulary, reinforcing mastery of basic grammar, dealing with more complex structures (verbal phrases, subordinate clauses), and using some patterns of indirect speech (repeating or relaying messages, giving reports, summarizing). Prerequisite: Port 1002 or equivalent. Laboratory fee. (Fall)

1004 **Intermediate Portuguese II (3)** Staff

Consolidation and further expansion of the ability to understand as well as produce a more complex level of oral and written discourse emphasizing subjective expression: issuing indirect commands and requests; giving opinions; making proposals, building arguments; defending and criticizing ideas. Prerequisite: Port 1003 or equivalent. Laboratory fee. (Spring)

1012 **Intensive Basic Portuguese (8)** Staff

Equivalent to Port 1001, 1002. Laboratory fee. (Summer)

2005 **Composition and Conversation (3)** Staff

Development of strong conversational skills and the rudiments of expository writing. The vocabulary and structures necessary to move from handling everyday experience and

subjective expression to the exposition of more abstract thought and ideas and discussion of political, social, and cultural issues. Prerequisite: Port 1004. Laboratory fee. (Fall)

2006 **Applied Portuguese Grammar (3)** Staff

Intensive study of Portuguese grammatical construction in oral and written form, including consideration of relationships across the history of the language and its grammar, linguistics, and dialectology. Prerequisite: Port 2005.

2010 **Accelerated Portuguese for Speakers of Another Romance Language (3)** Staff

An intensive course designed for speakers of another Romance language to develop competence quickly in spoken and written Portuguese. Laboratory fee. (Spring)

3100 **The Lusophone Atlantic World (3)** Staff

A wide-ranging cross-cultural examination of the Portuguese-speaking Atlantic world, which includes extensive areas of the Americas and West Africa. How Lusophone Atlantic populations relate to those of other areas, such as Mozambique and former Portuguese India, where Portuguese-based Creoles are or were spoken. Prerequisite: Port 2006 or consent of instructor.

3101 **Culture and Civilization of the Sephardim (3)** Staff

Focus on the cultural and religious background of the Jews of Spain and Portugal both before and since their expulsion/forced conversion in the late 15th century. Narrative and documentary histories from Sephardic cultures in the Iberian Peninsula and in the Diaspora are discussed. Prerequisite: Port 2006 or consent of instructor.

3600 **Topics in Lusophone Literature and Culture (3)** Staff

May be repeated for credit provided the topic differs. Prerequisite: Port 2006 or consent of instructor.

SLAVIC

1001–2 **First-Year Russian (4–4)** Shatalina and Staff

First part of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Prerequisite to Slav 1002: Slav 1001. Heritage speakers require permission to register. Laboratory fee. (Academic year)

1003–4 **Second-Year Russian (4–4)** Shatalina and Staff

Second half of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Prerequisite to Slav 1003: Slav 1002 or equivalent. Prerequisite to Slav 1004: Slav 1003 or placement test. Laboratory fee. (Academic year)

1012 **Intensive Basic Russian (8–8)** Robin and Staff

–1034 Beginning intensive course in fundamentals of speaking, understanding, reading, and writing Russian (equivalent to Slav 1001–2 and 1003–4).

Recommended for majors. Prerequisite to Slav 1034: Slav 1002 or 1012 or equivalent. Heritage speakers require permission to register. Laboratory fee. (Academic year)

1013–14 **Russian for Heritage Speakers (3–3)** Guslistova

Prepares heritage speakers of Russian for advanced study in Russian at the third-year level and beyond, including content courses in literature and area studies. Prerequisite: a placement test. (Academic year)

1391–92 **Introduction to 19th-Century Russian Literature—in English (3–3)** Rollberg

Slav 1391: Russian literature and society, 1800–1860s, concentrating on the Golden Age of Russian literature; poems and stories by Pushkin, Lermontov, Gogol, and Turgenev. Slav 1392: Russian literature and society on their way to modernity; great works of prose and drama by Dostoevsky, Tolstoy, Chekhov, and Bunin. (Academic year)

2005–6 **Intermediate Russian (5–5)** Shatalina and Staff

Practice in speaking, listening, reading, and writing at the intermediate level.

Prerequisite: Slav 1004 or 1034 or permission of instructor.

(Academic year)

2007–8 **Russia Today: Topics in Advanced Russian (3–3)** Staff

Practice in speaking, listening, reading, and writing at the advanced level.

Prerequisite: Slav 2006 or permission of instructor. (Academic year)

2015–16 **Readings in the Russian Press (3–3)** Guslistova

Reading and analysis of current Russian periodicals. For departmental majors and graduate students with a reading-language proficiency requirement.

2361 **Russian Culture to 1825 (3)** Staff

Survey of Russian cultural heritage from its ancient origins through the early 19th century. Architecture from the medieval period through the end of the Empire style. Iconography, the influence of the Church, and effects of the West on Russian culture.

2362 **Russian Culture since 1825 (3)** Staff

Survey of Russian culture from the 19th century through the present, including intellectual movements; realism in music, art, and theatre; ballet; avant-garde painting; and effects of Soviet policies and of Perestroika.

2365 **20th-Century Russian Literature to World War II (3)** Staff

Russian literature and culture of the first half of the 20th century: the impact of the revolution on writers and literature; avant-garde, socialist realism, and emigre literature (Nabokov)—in English.

2366 **Russian Literature from World War II to the Present (3)** Staff

Literature in wartime and in postwar years from Solzhenitsyn to the latest trends: the “thaws,” village and urban prose, post-Soviet literature, Russian postmodernism—in English.

2471 **19th-Century Russian Prose (3)** Staff

Reading and discussion of selected prose texts of the 19th century from Pushkin to Chekhov—in Russian. Prerequisite: Slav 2006 or equivalent; Slav 1391–92. (Fall, even years)

2472 **19th-Century Russian Poetry (3)** Staff

Reading and discussion of selected poetry of the 19th century (Pushkin, Lermontov, Nekrasov, and others)—in Russian. (Spring, odd years)

2473 **20th-Century Russian Prose (3)** Staff

Reading and discussion of selected prose of the 20th century from Bunin to Solzhenitsyn—in Russian. (Fall, odd years)

2474 **20th-Century Russian Poetry (3)** Staff

Reading and discussion of selected poetry of the 20th century from Blok to Brodsky—in Russian. Prerequisite: Slav 2006 or equivalent; Slav 2365, 2366. (Spring, even years)

2785–86 **Introduction to Russian Cinema (3–3)** Rollberg

(In English; all films subtitled.) Slav 2785: From Russian silents to the introduction of sound and color (1896–1946). The great revolutionary directors—Eisenstein, Pudovkin, Dovzhenko. Slav 2786: From post-war to post-perestroika cinema (since 1946): war films, adventure, films about youth.

4595 **Special Topics (3)** Staff

May be repeated for credit provided the topic differs.

4597–98 **Senior Honors Thesis (3–3)** Staff

Senior honors thesis on a topic related to Russian language, literature, or culture.

Required of and open only to honors candidates in the department.

SPANISH

1001–2 **Elementary Spanish I–II (4–4)** Staff

Development of basic functional and communicative proficiency in Spanish. Focus on the development of listening and speaking skills, reading and writing abilities, and intercultural competence. Span 1001 is prerequisite to Span 1002. Laboratory fee. (Fall, spring, and summer)

1003–4 **Intermediate Spanish I–II (3–3)** Staff

Development of intermediate functional and communicative proficiency in Spanish. Focus on the development of listening and speaking skills, reading and writing abilities, and intercultural competence. Prerequisite to Span 1003, Span 1002 or 1012; to Span 1004, Span 1003. Laboratory fee.

(Fall, spring, and summer)

1006–7 **GW Madrid Study Center: Spanish** Staff
Language and Culture I–II (3–3)

Offered through the Madrid Program only.

1012 **Intensive Elementary Spanish (8)** Staff

Equivalent to Span 1001–2. Laboratory fee. (Fall and spring)

1034 **Intensive Intermediate Spanish (6)** Staff

Equivalent to Span 1003–4. Prerequisite: Span 1002 or 1012. Laboratory fee.

(Fall and spring)

2005–6 **Advanced Spanish I–II (3–3)** Staff

Development of advanced Spanish proficiency, with a focus on argumentative speaking techniques and academic writing. Development of cross-cultural competence and analysis of historical, social, and cultural practices and perspectives of Spanish-speaking societies. Prerequisite to Span 2005, Span 1004 or 1034; to Span 2006, Span 2005.

Laboratory fee. (Academic year)

2056 **Intensive Advanced Spanish (6)** Staff

Equivalent to Span 2005–6. Prerequisite: Span 1004 or 1034. Laboratory fee.

(Summer)

2900 **Spanish for Graduate Students (0)** Staff

For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours.

(Fall, spring, and summer)

3010 **Advanced Spanish Writing (3)** Staff

Development of academic writing skills in Spanish through the analysis of specific issues of general interest. Study and practice of different forms of academic writing that can be applied in various disciplines. Prerequisite: Span 2006 or 2056. (Fall and spring)

3015 **Spanish for Heritage Speakers (3)** Staff

For bilingual students who wish to extend and improve their formal knowledge of Spanish by study of the basic rules of grammar and spelling that govern the language.

Prerequisite: the placement exam and an interview. Laboratory fee. (Fall)

3020 **Spanish for Oral Communication (3)** Staff

Development of effective strategies for oral communication and argumentation; expansion of vocabulary and register. Prerequisite: Span 2006 or 2056.

3021 **Advanced Spanish for Oral Communication—Latin America (3)**

For students enrolled in programs in Latin America. Prerequisite: Span 2006 or 2056.

3030 **Business and Commercial Spanish (3)** Staff

Structure and language of Latin American and Spanish economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Prerequisite: Span 2006. (Spring)

3040 **Advanced Spanish Service–Learning (3)** Staff

Practice of advanced oral and written work through community engagement, with consideration of social change and reflection on civic engagement, leadership, and service. Students work on local community service projects. Prerequisite: Span 2006 or 2056. Laboratory fee. (Fall and spring)

3100 **Readings in Spanish and Latin American Literature (3)** Staff

Readings, textual analysis, and writing on a broad selection of texts from different genres and periods. Spanish and Latin American literatures in their cultural contexts. Introduction to methods of literary analysis and criticism. Prerequisite: Span 2006 or 2056. (Fall and spring)

3210–20 **Spanish and Latin American Civilization I–II (3–3)** Staff

A panoramic view of the cultural and material history of Spain and Latin America from their origins to the present. Span 3210: from Roman Hispania to the end of the *siglo de oro*; Span 3220: from the 18th century to the present. Prerequisite: Span 3100 or equivalent. (Academic year)

3300 **Spanish and Latin American Literature in Translation (3)** Britt, Waisman

Dynamics of Hispanic societies and their cultures studied through literature, art, or film. Topics vary. Readings and lectures in English. The course may be repeated for credit. Laboratory fee may be required.

(Fall and spring, alternate years)

The Spanish courses that follow have a prerequisite of Span 3100 or equivalent.

3400 **Theatre of Spain and Latin America (3)** Britt, Captain

Theatrical representation: presence and performance, body, voice, dialogue, and the unfolding of conflict. Theatrical traditions and movements may include Golden Age drama; neo-Classical and Romantic drama of the 19th century; drama of political protest; existentialist drama and the theater of the avant-gardes. (Spring, alternate years)

3410 **Latin American Short Fiction (3)** Captain, Vergara, Waisman

Short prose narratives as agents of questioning textual meaning and subverting former literary traditions. Writers may include Arenas, Borges, Cortázar, Fuentes, García Márquez, Quiroga, Peri Rossi, Ana Lydia Vega, Zapata Olivella. (Fall)

3420 **The Essayist Tradition in Latin America (3)** Britt, Captain, Waisman

Relations between state and nation in post-independence literary and political polemics of 19th-century Latin America. Topics may include the essay as a new genre for a new age; the figure of the public intellectual vis-à-vis the processes of state and nation formation; the post-colonial state and its imagined national, ethnic, racial, and economic communities.

(Spring, alternate years)

3430 **Afro–Latin America in the Diaspora (3)** Captain

Major issues related to the diaspora of people of African descent in Latin America: racial–ethnic identity and nation, the myth of racial democracy, ties with “the motherland,” ties with other diaspora communities, emigration, the role of the arts in these questions. (Fall, alternate years)

3440 **Caribbean Literature and Culture (3)** Captain, Marroquin

Literary and cultural trends emanating from the Spanish-speaking Caribbean, focusing on Cuba, the Dominican republic, and Puerto Rico, with some attention to the circum-Caribbean regions of Central and South America.

(Fall, alternate years)

3500 **Medieval Spanish Literature (3)** Britt

Reading and analysis of the major literary texts from the 11th through the 15th century. Attention paid to linguistic aspects of Old Spanish.

3510 **Golden Age Literature (3)** Britt

Major texts of the 16th and 17th centuries. Topics may include lyric poetry and the “invention” of subjectivity; prose fiction; *comedia* and the relation between private and public life; humanism and the classical tradition; the

invention of the press, the status of writing, and the new culture of the book;
the (post)modernity of Golden Age literature.

3520 **Latin American Colonial Literature (3)** Captain, Marroquin

Analysis of chronicles, essays, memoirs, epistolary exchanges, and poetry contextualized vis-à-vis the medieval and Renaissance values of Imperial Spain. Authors may include Cabeza de Vaca, Bartolomé de las Casas, Colón, Cortés, Díaz del Castillo, El Inca Garcilaso de la Vega, Sor Juana Inés de la Cruz, Rodríguez Freile, Sepúlveda. (Spring)

3530 **Enlightenment in Spain (3)** Britt

The development of neoclassical aesthetics in Spain: the confrontation of reason and superstition; the autonomy of critical thought vis-à-vis the doctrines of the Catholic Church and the absolute powers of the monarchy; culture as state-sponsored spectacle; the split between elites and masses, high and low culture; the conjunction of “good taste” and pedagogy.

3540 **Major Authors of Spain and Latin America (3)** Vergara, Waisman

Close readings of the work of a major author and application of related critical and theoretical material. Authors may include J.L. Borges, G. Garcia Marquez, Clarice Lispector, M.L. Bombal, Juan Goytisolo, Juan Rulfo, Alejo Carpentier, Manuel Puig. (Spring, alternate years)

3560 **Early Modern Poetry of Spain and Latin America (3)** Vergara

Study of poetic traditions and genres. Analysis of representative texts from the early modern to the contemporary periods. Authors may include: Garcilaso, Quevedo, Darío, Silva, Lorca, Neruda, Salinas, Jiménez, Gioconda Belli. (Spring)

3570 Latin American Women Writers (3)

Vergara

Works of well-established women writers (e.g., Sor Juana Inés de la Cruz, Gabriela Mistral, and Luisa Valenzuela) and of more recent writers (e.g., Elena Poniatowska, Diamela Eltit, Ana Lydia Vega, Cristina Peri-Rossi, and Laura Esquivel) discussed in relation to feminist principles of criticism. (Spring)

**3580 Latin American Romanticism
and Modernism (3)**

Captain, Vergara, Waisman

Study of two movements that shaped literary expression of Latin America at the turn of the century and influenced political and cultural thought throughout the Hispanic world. Authors may include Heredia, Echeverría, Avellaneda, Isaacs, Darío, Martí, Lugones. (Fall, alternate years)

3600 Special Topics in Spanish and Latin American Literature (3)

Staff

May be repeated for credit provided the topic differs.

3650 Literature and Dictatorship (3)

Waisman, Britt

Study of the dynamic relationship between literature and politics during periods of intense social repression and censorship in Spain and/or Latin America. Issues raised in and by literature when discourse is controlled, censored, and repressed by military dictatorships. The role of culture in understanding traumatic historical events. (Spring, alternate years)

3700 Cinema of Spain and Latin America (3)

Britt, Captain

Film as a language of cultural and historical testimony in Spanish America and Spain. Topics may include the Silent Era, Surrealism, the Mexican Golden Age of the '40s, the New Cinema of the '50s, Peronist cinema in Argentina, socialist film in Cuba, and postmodern production. May be repeated for credit. Laboratory fee. (Fall)

4410 **Contemporary Narrative in Latin America** (3) Captain, Vergara, Waisman

Experimental fiction in Latin America, with focus on literature of the mid-1960s through the present. Authors may include Alejo Carpentier, Julio Cortázar, Diamela Eltit, Carlos Fuentes, Cabrera Infante, Lezama Lima, García Márquez, Octavio Paz, Ricardo Piglia, Elena Poniatowska, Mario Vargas Llosa. (Fall)

4450 **Mexican Literature and Culture** (3) Marroquin

Study and analysis of Mexico's most significant intellectual, historical, and cultural events from the Spanish Conquest of the Aztec empire to the present. Topics include the Spanish appropriation of the Aztec Empire, literature and cultural phenomena during the colonial period, the age of independence, the Mexican revolution, and contemporary Mexico.

(Fall, alternate years)

4460 **Southern Cone Literature and Culture** (3) Waisman

Study and analysis of some of the most significant writers, ideas, texts, and films of Argentina, Chile, and Uruguay. Issues of tradition, identity, representation, modernity, gender and sexuality, and literature and politics as seen in historical context. (Fall, alternate years)

4470 **Exploration and Travel Writing in Latin America** (3) Vergara

Critical analysis of the writings of selected conquerors, explorers, and visitors to Latin America. Connections between travel writing and forms of knowledge and expression that interact and intersect with writings both within and outside Europe. (Fall, alternate years)

4510 **Cervantes' *Don Quijote*** (3) Marroquin, Britt

Issues raised in the text of *Don Quijote*: literature and life, words and deed, the fashioning of self, the structures of narrative, the limits and possibilities of representation, and the relation between appearance and reality, knowledge and understanding, fiction and truth. Cervantes' "invention" of the novel.

4520 **Topics in the Avant-garde (3)**

Britt, Waisman

Study of the literary and artistic avant-gardes of Spain and Latin America in relation to the dialectic of enlightenment. Consideration of the avant-gardes as successful interpretations of modernity and as movements that anticipate, and in some instances instigate, the "post-modern" end of modernity.

(Spring, alternate years)

4540 **The Myth of the Two Spains (3)**

Britt

Literature as an expression of the institutionalization of liberalism in 19th-century Spain and of official and popular resistance to this modernizing credo. Topics may include the romanticism of Quintana, Espronceda, Blanco-White and Becquer; the *costumbrismo* of Castro and Larra; the realism of Galdós; and the naturalism of Pardo Bazán and Clarín.

4550 **Spain's First Century Without Empire (3)**

Britt

Spain's imperial crisis and its persistence throughout the 20th century as a central theme in Spanish literary and intellectual culture. Topics may include decadence and regeneration; modern Spanish nationalism and cultural imperialism; Hispanicism and pan-nationalism; the Spanish Civil War, fascism and liberalism; the transition from fascism to democracy. (Fall)

4560 **Modern Poetry of Spain and Latin America (3)** Vergara, Waisman

Poetry after modernism; forms and themes that characterize the work of authors such as Agustini, Guillén, Huidobro, Lezama, Mistral, Neruda, and Palés. (Spring)

4650 **Literary Translation (3)** Waisman

Combination literary translation workshop and seminar on translation theory. Study of the main issues of literary translation between Spanish and English, in both directions, as seen in different writers and genres. Translation of writings on cultural, philosophic, and political issues. (Fall, alternate years)

4700 **Film as Text in Latin America (3)** Captain

The basic points of filmic analysis as related to Latin American cinema. Issues of film as a genre in its own right, the particular language of cinema, relationships between written text and film, and other interdisciplinary aspects of narrative. (Fall, alternate years)

4800 **Independent Study (arr.)** Staff

Admission by permission of department chair and instructor. May be repeated for credit.

4910–20 **Proseminar (3–3)** Staff

Required of all majors; preparation for the major field examination. Literature in relation to the other arts and the social sciences. Span 4910: textual analysis, literary criticism, theory, and methods. Span 4920: the concepts of literary history and the history of Spanish and Latin American literature; periods, authors, genres, topics. (Academic year)

ROMANCE LANGUAGES AND LITERATURES

3300 **Topics in Romance Literatures and Cultures in Translation (3)** Staff

Topics and themes providing a multicultural and comparative approach to the study of the cultural productions of French, Italian, and Spanish-speaking people. Readings and lectures in English. May be repeated for credit provided the topic varies. A laboratory fee may be required. (Fall)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

This interdisciplinary course is offered under the joint auspices of the departments in the School of Engineering and Applied Science.

1001 Engineering Orientation (1)

Dolling and Staff

Introduction to careers in engineering and computer science, University resources, and computer skill development. Emphasizes teamwork skills by applying them to several design projects. (Fall)

SIGN LANGUAGE

See **Speech and Hearing Science**.

SLAVIC

See **Romance, German, and Slavic Languages and Literatures**.

SOCIOLOGY

University Professor A. Etzioni

Professors P.H.M. Lengermann (*Research*), W.J. Chambliss, S.A. Tuch (*Chair*), R.

Weitzer, R.J. Cottrol, G.D. Squires, R. Whitaker, D. Guthrie

Associate Professors C. Deitch, I. Ken, D.S. Eglitis

Assistant Professors F. Buntman, H. Ishizawa, A. Jones, M. Kelso, E. Morrison, V. Rankin

(*Research*)

Professorial Lecturers R.B. Zamoff, P.A. Konwerski, D. Marshall, L. Osborne

Lecturers M. Wenger, L. Joseph

Bachelor of Arts with a major in sociology—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite course—Soc 1001 or 1002.
3. Required courses in the major—Soc 2101, 2102, 2103, 2104, 4197, and seven additional upper-division sociology courses, including at least two courses chosen from the 2160s or 2170s groups. It is recommended that Soc 2101 and 2102 be taken before the senior year.

Bachelor of Arts with a major in criminal justice—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite course—Soc 1001 or 1002.
3. Required courses in the major—Soc 1003, 2101, 2102, 2136, 2145, 4192; PPPA 2117; and five courses chosen from Soc 2135, 2167, 2178, 2184, 2189, 5785; Psyc 2011, 3154; ForS 2103–4; PSc 2213, 2215; Anth 3513; Hist 3370; Econ 2167. Of the five courses, at least one sociology course and at least one non-sociology course must be taken; students must verify that they have met any prerequisites before registering. It is recommended that Soc 2101 and 2102 be taken before the senior year.

Bachelor of Arts with a major in human services—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite course—Soc 1001 or 1002.

3. Required courses in related areas—Phil 2135 and one course chosen from Comm 1040, 1041, 1042, 2120.

4. Required courses in the major—HmSr 3152, 2171, 2172, 2176, 1177, 2182, 4195; Soc 2101, 2104.

Combined bachelor's/master's dual-degree programs—Four programs are offered: the B.A. and M.A. in sociology, the B.A. in criminal justice and M.A. in criminology, and the B.A. in criminal justice or human services and Master of Public Administration. Interested students should contact their advisor by the end of their sophomore year.

Special Honors—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in sociology or criminal justice or human services must maintain a 3.3 grade-point average in the major, must be registered in Soc 3195 or HmSr 4193 during their senior year, and must complete a senior honors thesis.

Minor in sociology—18 hours of course work are required, including either Soc 1001 or 1002, either Soc 2103 or 2104, and four upper-division sociology courses, excluding Soc 4192 and 4197.

Minor in criminal justice—18 hours of course work are required, including either Soc 1001 or 1002, 1003, 2136, and 2145, plus 6 hours of electives chosen from Soc 2135, 2167, 2178, 2184, 2189, 5785; Psyc 2011, 3154; ForS 2103; PSc 2213 or 2215; PPPA 2117; Anth 3513; and Hist 3370. At least one elective must be a sociology course.

Minor in human services—A minimum of 18 hours of course work, including HmSr 3152 (6 hours), 2176, 2182, 4195, and an elective chosen with permission of advisor.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: A student majoring in sociology may not declare a second major or a minor in criminal justice, or vice versa. Students in all three departmental majors and minors are required to earn a grade of *C–* or better in all courses in the major or minor. If a student receives a grade of *D+*, *D*, or *D–*, the student may either (1) repeat the course, in which case the grade in the repeated course must be no lower than a *C–*, and grades for both the original and repeated courses will appear on the student's transcript; or (2) take an upper-division course in the same department, in addition to the minimum number of courses required for the major, and receive a grade no lower than *C–*. Option 1 must be approved by the department chair in writing before the student may register for a course a second time.

Departmental prerequisite: Either Soc 1001 or 1002 is prerequisite to all upper-division sociology courses.

SOCIOLOGY

1001 **Introduction to Sociology (3)** Staff

A broad overview of the “sociological imagination” as a way of understanding social issues and personal experience; sociology's place among the social sciences; basic elements of sociological perspectives.

(Fall and spring)

1002 **The Sociological Imagination (3)** Ken, Eglitis

Using the sociological—rather than the psychological, economic, or religious—imagination, students gain experience making connections between those things that seem

intimate and personal and those that give order to the social world. An introduction to sociology that engages students in such topics in the field as issues of race, gender, inequality, and education.

(Fall and spring)

1003 **Introduction to Criminal Justice** (3) Weitzer, Buntman

An introduction to the study of criminal justice. The historical development of criminal justice and its evolution into modern legal systems. The impact of different forms of criminal justice on society and the individual.

(Fall and spring)

2101 **Social Research Methods** (3) Tuch, Ishizawa, Jones

Lecture (3 hours), laboratory (1 hour). Introduction to basic research methods in sociology. Topics include research design, sampling, measurement, and analysis of survey data via computer application. (Fall)

2102 **Techniques of Data Analysis** (3) Tuch, Ishizawa, Jones

Continuation of Soc 2101. Examination of a range of topics in the statistical analysis of sociological data, with a strong emphasis on computer applications. Prerequisite: Soc 2101. (Spring)

2103 **Classical Sociological Theory** (3) Ken, Eglitis

Analysis and critique of the development of Western European and North American social thought in the period of modernity. Consideration of the development of classical theoretical statements and the emergence of topics of sociological inquiry globally. (Fall)

2104 **Contemporary Sociological Theory** (3) Ken, Eglitis

A systematic evaluation of the work of selected social theorists of the post–World War II era. Emphasis on application of theoretical concepts to matters of present-day concern. (Fall and spring)

2105 **Social Problems in American Society (3)** Squires

Introduction to critical social problems (e.g., unemployment, poverty, crime, discrimination) in the United States and how they are, and have historically been, researched and understood by the academic and non-academic worlds. Concepts, theories, and methods of sociological research; examination of the field of social problems generally, emphasizing contemporary social problems.

2111 **Field Research (3)** Chambliss, Weitzer

Examination of the logic of qualitative inquiry and techniques of qualitative data collection and analysis. Various research methods are covered, with an emphasis on intensive interviewing, participant observation in field settings, and focus groups. (Spring)

2112 **Evaluation Research (3)** Staff

Introduction to the evaluation of public programs designed to address the impact of social problems on individuals, households, and larger collective groups. Application of social science theory and research methods to the assessment of impact benefits and costs of such programs. (Fall)

2135 **Youth and Delinquency (3)** Chambliss

Analysis of historical, economic, and social conditions affecting both difficulties in socializing youth and the evolution of the state's formal systems of control. (Spring)

2136 **Criminology (3)** Chambliss, Weitzer

Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions. Analysis of the historical, social, legal, and cultural conditions affecting the nature of crime, criminality, and the development of state responses made to it.

(Fall and spring)

2145 **Criminal Law (3)** Chambliss, Buntman

Introduction to the sources and fundamental principles of criminal law and procedure using major sociological perspectives as interpretive tools.

(Fall and spring)

2150 **Sociology of Sport (3)** Zamoff

Sport as a social institution; the role, consequences, and functions of sport in U.S. society. Relationships between sport and the institutions that impact our lives: education, mass media, economics, politics, etc. (Fall)

2151 **Jackie Robinson: Race, Sport, and the American Dream (3)** Zamoff

How Jackie Robinson's struggles and accomplishments can help in understanding current issues in race, sport, and U.S. society. The background leading to, and the impact emanating from, Robinson's entry into major league baseball. (Fall)

2161 **Sociology of Complex Organizations (3)** Staff

Review of sociological approaches to the study of complex organizations. Selected and comparative emphasis on bureaucratic organization in both government and private sectors. (Spring)

2162 **Sociology of the Family (3)** Staff

An examination of the stages of family life: birth, childhood, premarital relationships, marriage and sex roles in marriage, retirement and old age. Special emphasis on development and maintenance of interpersonal relations. (Fall)

2163 **Sociology of Education** (3) Staff

Analysis of educational systems from historical–comparative, institutional, and micro-sociological perspectives. Emphasis on educational systems in relation to the religious, cultural, economic, and political forces shaping their character; the role of formal education in modern society. (Spring)

2165 **Sociology of Religion** (3) Staff

Analysis of the relationships between religion and society. Topics include the contribution of religion to social integration, social change, and social inequality; the nature of religious experience; religious symbolism; the basis of religious communities. (Spring)

2167 **Sociology of Law** (3) Chambliss, Buntman

Law as a social phenomenon and agency of social control. Special emphasis is placed on study of the sources of and challenges to the legitimacy of law. (Fall)

2168 **Economic Sociology** (3) Staff

Sociological approach to the study of micro- and macroeconomic behavior. Historical and comparative analyses informed by the literature of sociology and other social sciences. Critical review of economic policy in developing, post-communist and advanced market societies. (Spring)

2169 **Urban Sociology** (3) Squires, Ishizawa, Jones

Analysis of the city from a sociological perspective. Topics include a focus on the social change and inequality associated with urban growth, neighborhood change, and suburbanization; residential segregation; the issue of whether community exists in cities; urban poverty and homelessness.

(Fall and spring)

2170 **Class and Inequality (3)**

Tuch, Eglitis, and Staff

Analysis of distribution of resources and opportunities for participation, education, and social mobility. International comparisons; analysis of public policies that affect these distributions. (Fall)

2173 **Social Movements (3)**

Staff

General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions. (Spring)

2175 **Sociology of Sex and Gender (3)**

Ken, Eglitis, and Staff

The consideration of gender and sex as organizing principles of social relations. Analysis of the dynamics of inequality in such areas as families, the workforce, culture and mass media, politics, sexual relationships, law medicine, religion, and education.

2177 **Sociology of the Sex Industry (3)**

Weitzer

Sociological examination of sex workers and businesses in the United States and other nations. Analysis of major theoretical perspectives and research on the social organization of sex work, the experiences of participants, issues of gender and sexuality, and alternative policy frameworks regarding prostitution, pornography, and commercial stripping.

Prerequisite: Soc 2175 or 2178.

2178 **Deviance and Control (3)**

Weitzer

Examination of deviant behavior and its control. Topics include theoretical perspectives, changing societal conceptions of deviance, deviant behavior and identity, and the dynamics of control agencies. (Fall)

2179 **Race and Minority Relations (3)**

Tuch, Squires, Jones, and Staff

Analysis of relationships between dominant and minority groups in society; nature and range of problems; analysis of the phenomenon of prejudice.

(Spring)

2181 **Special Topics in Sociology (3)**

Staff

Analysis and examination of various processes in society of general importance to the field of sociology, e.g., social conflict, socialization, social change. Topic changes each semester; may be repeated once for credit.

(Fall and spring)

2184 **Violence and the Family (3)**

Staff

Comparative approach to power and violence in family systems. Analysis of devaluation of family relations. Critical survey of explanations of violence and responses made to it. (Fall)

2189 **Special Topics in Criminal Justice (3)**

Staff

Analysis and examination of various processes and problems of general importance to the field of criminal justice. Topic changes each semester; may be repeated once for credit. (Fall and spring)

3195 **Research (1 to 3)**

Staff

Independent study and special projects. Open only to selected undergraduates with promising academic records. Prerequisite: Students must submit a written proposal of their plan of study for the approval of the member of the department who will direct the research. May be repeated for credit to a maximum of 6 credits. (Fall, spring, and summer)

4192 Advanced Seminar in Criminal Justice (6) Chambliss, Weitzer

Restricted to seniors majoring in criminal justice. Internship in a criminal justice agency; field placement in consultation with a faculty member is required before registration. Weekly seminar meetings, presentations, journal, and a paper are required. Prerequisite: Soc 2136 or 2145.

(Fall and spring)

4197 Advanced Seminar in Sociology (6) Eglitis

Restricted to seniors majoring in sociology. Students spend at least 12 hours a week in an approved community agency or organization in metropolitan Washington. Field placement in consultation with a faculty member is required. Weekly seminar meetings, reports, a journal, and a written paper are required. (Fall and spring)

HUMAN SERVICES

1177 Human Services and Community: Konwerski
Empowerment for Social Change (3)

The community as a laboratory for the study of contemporary issues in philanthropy aimed toward social change. Through readings, observations, and group internships, students participate in various aspects of community service. (Fall)

2133 Supervised Experience in Human Services (3 to 6) Kelso, Morrison

Development of experience-based perspective on human services through fieldwork in a community-based agency or organization. Meetings, journal, and research paper.

Admission by permission of instructor.

(Fall and spring)

2171 **Introduction to Human Development I (3)** Staff

Lectures and fieldwork. All aspects of development through adolescence; child study techniques. Two to three hours weekly field experience in appropriate setting. (Fall)

2172 **Introduction to Human Development II (3)** Staff

Adult development from young adulthood to old age. Dominant psychosocial, cognitive, and physical competencies; motivational changes; coping styles; normative and non-normative behaviors. Three hours weekly field experience in appropriate agency setting. (Spring)

2176 **Program Planning and Development for Service Agencies (3)** Kelso

The program planning and development activities essential to human service agencies. Through case studies and on-site field experiences, students analyze processes by which agency needs are assessed and programs planned. Community-based research. Prerequisite: Status as a human services major or minor or permission of the instructor. (Fall)

2182 **Organization and Administration in the Human Services (3)** Kelso

Introduction to organizational theory and program administration in community agencies: staff recruitment and development; fiscal operations including funding; facilities; and effective community relations. Community-based research. Prerequisite: Status as a human services major or minor or permission of the instructor. (Spring)

3152 **Issues in Human Services (1 to 6)** Morrison

An inquiry into the values and methods of practitioners in the field of human services, linking academic study and field experience. Admission by permission of instructor. (Fall and spring)

4193 **Research and Independent Study** (arr.) Morrison

Individual research and special projects. Admission by permission of instructor.

4195 **Seminar in Human Services: Current Issues** (3) Konwerski

Analysis of selected issues in human services. Each student conducts an investigation of an identified problem in human services and completes a skill assessment project.

Admission by permission of instructor. (Spring)

4198 **Topics in Human Services** (1 to 3) Kelso, Whitaker

Topics to be announced in the Schedule of Classes. May be repeated for credit.

SPANISH

See **Romance, German, and Slavic Languages and Literatures**.

SPEECH AND HEARING SCIENCE

Professors C.W. Linebaugh, G.M. Schulz, J. Mahshie (*Chair*), L. Bernstein

Associate Professors S. Brundage, F. Subiaul

Assistant Professors N.S. Richards, A.B. Hancock, C. Core, M. Thothathiri, S. Campbell

(*Teaching*)

Teaching Instructor M.E. O'Donnell

Professorial Lecturer M.E. Moody

Bachelor of Arts with a major in speech and hearing science—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in the major—The major consists of 46 or 47 credits, depending on the concentration chosen. All students take a required core of SpHr 1071, 2107, 3116, 2130, 2131, 4118, and a concentration in the major that must be chosen by the beginning of the junior year.
3. The concentrations consist of nine courses, six required and three elective. Required courses for each concentration are listed below; concentration electives are chosen in consultation with the departmental advisor from lists of designated courses.
 - (a) Speech–language pathology—SpHr 2104, 2105, 2106, 2108, 4119, 2132.
 - (b) Hearing and deafness—SpHr 1081, 1082, 1084, 2106, 2108, 2117.
 - (c) Brain and language—SpHr 2106, 2132, 2133, Psyc 2013, 3122, Anth/Ling 603.
 - (d) Language and culture—SpHr 1072, 1084, either 2105 or 2106, 2132, Anth/Ling 3601, 3603.

Students who plan to go on to graduate study in speech–language pathology or audiology should note that certification by the American Speech–Language and Hearing Association requires course work in the following areas: biological sciences, physical sciences, social/behavioral sciences, and statistics. This course work should be obtained during the student’s undergraduate program.

Special Honors—To qualify for graduation with Special Honors, the student must fulfill the general requirements stated under University Regulations, submit an application to the department before the beginning of the senior year, register for at least 1 credit of SpHr 4196, and complete an independent study honors project with distinction. Students

must confer with an advisor before beginning the work. A 3.75 grade-point average in the major and overall is required both for acceptance and for graduation with Special Honors.

Minor in speech and hearing science—18 credit hours, including SpHr 1071, 2105, 2107, plus three courses selected from SpHr 2104, 2106, 2108, 3116, 2130, 2131, 2132.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Speech and hearing services are offered by the Speech and Hearing Center, 202-994-7360.

1011 **Voice and Diction (3)** Hancock, Richards, Moody, and Staff

Development of naturalness, correctness, and clarity in conversation through the study of phonetics, rate, volume, pitch, and quality in preparation for performance. Laboratory fee. (Fall, spring, and summer)

1071 **Foundations of Human Communication (3)** Moody, Richards, Subiaul

An introduction to the fundamental principles of the biology of speech, hearing and language, language structure and use, and human communicative interaction. Practice in the identification of specific verbal and nonverbal aspects of communication behavior. (Fall and spring)

1072 **Multicultural Issues in Human Communication (3)** Staff

Consideration of the influences of culture and bilingualism on language development and use and on communicative interaction; experimental and ethnographic methods for studying language and communication in a multicultural society. (Fall and spring)

1081-82 **American Sign Language I-II-III** (3 each) O'Donnell

–2083 Development of basic communication skills, with appropriate vocabulary and grammatical structures; emphasis on comprehension skills. Prerequisite: to SpHr 1082, SpHr 1081; to SpHr 1083, SpHr 1082. (Fall and spring)

1084 **Perspectives in Deaf Culture** (3) O'Donnell

Introduction to the Deaf community as a linguistic and cultural minority group. The roles of deaf people in the larger society, including political activism. Generational differences concerning education, socioeconomic status, medical issues, and language. (Spring)

2104 **Speech and Language Disorders** (3) Williamson

Survey of the nature and causes of developmental and acquired disorders of speech and language. Emphasis on prevention and effective communication with persons having a speech–language impairment. (Fall)

2105–6 **Anatomy and Physiology for
Speech and Hearing I–II** (4–4) Brewer, Schulz, Mahshie

SpHr 2105: Anatomy and physiology of the respiratory, phonatory, articulatory, and resonatory subsystems of speech; swallowing; and the cranial nerves. SpHr 2106: Anatomy of the ear; physiology of hearing; anatomy of the brain and spinal cord; physiology of the nervous system. Laboratory fee. (Academic year)

2107 **Acoustics** (3) Brewer

The basic acoustics needed for understanding audition, speech acoustics and perception, and instrumentation. Laboratory fee. Prerequisite or corequisite: SpHr 2130. (Fall)

2108 **Introduction to Audiology** (3) Brewer

Survey of the field of audiology, including the measurement of hearing, the nature and causes of hearing impairment, hearing aids and habilitation/rehabilitation of the hearing impaired. Prerequisite: SpHr 2107; prerequisite or corequisite: SpHr 2106. Laboratory fee. (Spring)

2117 **Hearing and Perception (3)** Brewer

Consideration of the psychoacoustics of the normal auditory system in terms of auditory sensitivity, loudness, pitch, masking, and binaural hearing. Topics in speech perception that build upon psychoacoustics and speech acoustics. Prerequisite: SpHr 2108.

2130 **Phonetics and Phonological Development (3)** Richards

Detailed study of English phonetics and phonology; prespeech vocalization and phonological development; multicultural issues in phonological development; intensive practice in phonetic transcription. Prerequisite or corequisite: SpHr 2105. Laboratory fee. (Fall)

2131 **Language Acquisition and Development (3)** Core

Theories of language acquisition; development of language from birth through adolescence; emphasis on development of semantics, syntax, morphology, and pragmatics; multicultural issues in language development. Laboratory fee. Prerequisite: SpHr

2130. (Spring)

2132 **Literacy (3)** Staff

An overview of literacy development (thinking, listening, speaking, reading, spelling, writing) with emphasis on reading and writing development. Laboratory fee. Prerequisite:

SpHr 1071. (Fall)

2133 **Autism (3)** Subiaul

How the study of autism and related disorders may shed light on the characteristics of the mind. The broad characteristics of autism spectrum disorders, including cognitive, behavioral, and neural aspects; definitions of typical vs. atypical development; and difficulties associated with diagnosis and treatment.

3116 Brain and Language (3)

Hancock, Schulz

How the brain operates for language production and understanding and how damage to the brain can interrupt neural processes with a variety of neurolinguistic consequences. Neuroimaging and behavioral research that informs the understanding of the bases of neurolinguistic communication disorders. Prerequisite or corequisite: SpHr 2106.

3199 Selected Topics (3)

Staff

Topic announced in the Schedule of Classes. May be repeated for credit provided the topic differs.

4118 Senior Seminar (3)

Brundage

Critical evaluation of the research literature on speech and hearing; the process of scientific writing and analysis; how research can inform and improve clinical practice. For departmental majors in the senior year. Prerequisite: SpHr 2104 or 1071. Laboratory fee. (Fall)

4119 Analysis and Modification of Communication Disorders (3)

Staff

For department majors in their senior year. Assessment of speaker–listener behavior; acoustic, behavioral, and linguistic properties of speaker intelligibility and credibility; observation, analysis, and modification of speech and language comprehension and expression. Prerequisite: senior standing. Laboratory fee. (Spring)

4196 Independent Study (1 to 6)

Staff

Independent research and special projects. Before students are permitted to register for SpHr 4196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will direct the study and of the department chair.

STATISTICS

Professors J.L. Gastwirth, J.M. Lachin III, H.M. Mahmoud, T.K. Nayak, Z. Li, J. Chandra
(*Research*), R. Modarres (*Chair*)

Associate Professors S. Bose, E. Bura, S. Kundu, M. Larsen, Y. Lai, J.R. Stroud

Assistant Professors S. Balaji, Q. Pan, J. Landon, T. Apanasovich

Professorial Lecturers F. Ponti, P. Chandhok, C.M. Fleming

Bachelor of Science with a major in statistics—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Prerequisite courses—Math 1231, 1232, 2233; an introductory course in statistical methods.
3. Required courses in the major—Math 2184; Stat 2118, 3119, 1129, 4157–58, and either 2183 or 4197, plus three approved upper-division courses, some of which, in special circumstances, may be taken in other departments. To assure a balanced program, departmental approval of electives is required for all majors.

Students who seek Special Honors in statistics should check with the Department.

Minor in statistics—18 hours of approved courses in this department, including an introductory statistics course, Stat 2118 or 2123, and one computer-intensive course.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Stat 1051, 1053, 1111, and 1127 are related in their subject matter, and credit for only one of these courses may be applied toward a degree. One entrance unit in algebra is prerequisite to all courses in statistics.

1051 Introduction to Business and Economic Statistics (3) Nayak and Staff

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, probability distributions, sampling, estimation, tests of hypotheses, regression and correlation, with applications to business.

(Fall and spring)

1053 Introduction to Statistics in Social Science (3) Balaji and Staff

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, regression and correlation, with applications to social sciences. (Fall and spring)

1111 Business and Economic Statistics I (3) Gastwirth, Bura

Descriptive statistics, graphical methods, probability, special distributions, random variables, sampling, estimation and confidence intervals, hypothesis testing, correlation and regression. (Fall)

1127 Statistics for the Biological Sciences (3) Lai

Introduction to statistical techniques and reasoning applicable to the biomedical and related sciences. Properties of basic probability functions: binomial, Poisson, and normal. Data analysis, inference, and experimental design. (Spring)

1129 **Introduction to Computing (3)** Teitel

Introduction to elements of computer programming and problem-solving using Pascal. Hands-on experience will be acquired through computer programming projects, including some simple statistical applications.

(Fall and spring)

2105 **Statistics in the Behavioral Sciences (3)** Staff

Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, nonparametric techniques, sampling theory. Prerequisite: an introductory statistics course and satisfactory performance on a placement examination. (Fall)

2112 **Business and Economic Statistics II (3)** Gastwirth, Bura

Continuation of Stat 1111, with emphasis on techniques of regression, chi-square, nonparametric inference, index numbers, time series, decision analysis, and other topics used in economics and business. Prerequisite: Stat 1111 or equivalent. (Fall and spring)

2118 **Regression Analysis (3)** Kundu

Lecture (3 hours), laboratory (1 hour). Simple and multiple linear regression, partial correlation, residual analysis, stepwise model building, multicollinearity and diagnostic methods, indicator variables. Prerequisite: an introductory statistics course. (Fall and spring)

2123 **Introduction to Econometrics (3)** Staff

Same as Econ 2123.

2183 **Intermediate Statistical Laboratory:** Landon, Modarres
Statistical Computing Packages (3)

Application of program packages (e.g., SAS, SPSS) to the solution of one-, two- and k-sample parametric and nonparametric statistical problems. Basic concepts in data preparation, modification, analysis and interpretation of results. Prerequisite: an introductory statistics course.

3119 **Analysis of Variance** (3) Staff

Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; randomized block, factorial, Latin square designs, and analysis of covariance. Prerequisite: Stat 2118.

(Spring)

3187 **Introduction to Sampling** (3) Nayak

Problems of sampling and sample design. Simple random, stratified, systematic, cluster, and multistate designs; control of sampling and non-sampling errors. Prerequisite: Stat 1051 or equivalent.

4157–58 **Introduction to Mathematical Statistics** (3–3) Pan, Mahmoud

Stat 4157: Basic concepts of probability theory, including random variables, independence, distribution theory, and sampling theory. Stat 4158: Inference procedures, including estimation, hypothesis testing, regression analysis, and experimental design.

Prerequisite: Math 1232 or equivalent.

(Academic year)

4181 **Applied Time Series Analysis** (3) Stroud

Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate time series. Estimation of spectral density functions, white noise tests, and tests

for periodicities. Theory and applications using SAS. Prerequisite: Math 2233, Stat 4157–58 or 2118. (Spring)

4188 **Nonparametric Statistical Inference (3)** Staff

Statistical inference when the form of the underlying distribution is not fully specified. Nonparametric procedures for estimation and testing hypotheses. An introduction to robust procedures. Prerequisite: Stat 1051 or equivalent. (Fall, even years)

4189–90 **Mathematical Probability and Applications (3–3)** Mahmoud

Probability theory, including combinatorial analysis, conditional probability, and stochastic independence. Random variables and their distributions; laws of large numbers and central limit theorem. Application of concepts to elementary stochastic processes (coin-tossing sequences, branching processes, Markov chains). Prerequisite: Math 1232 or equivalent.

(Alternate academic years)

4195 **Reading and Research (arr.)** Staff

May be repeated once for credit. Admission by permission of department chair. (Fall and spring)

4197 **Fundamentals of SAS Programming** Landon, Modarres
 for Data Management (3)

Fundamentals of the SAS system for data management, statistical analysis, and report writing. Data modification; programming; file handling; and macro writing. Prerequisite: An introductory statistics course and Stat 1129.

(Spring)

4198 **Special Topics (3)** Staff

Topic to be announced in the Schedule of Classes. May be repeated for credit provided the content differs.

STRATEGIC MANAGEMENT AND PUBLIC POLICY

Professors H.J. Davis, W.H. Becker, D.J. Lenn, T.L. Fort (*Chair*), J.H. Beales III, J.J.

Griffin

Associate Professors J.B. Thurman, J.W. Cook, E.J. Englander, J. Forrer (*Research*), J.

Rivera

Assistant Professors E.H. Kim, J. Walter, K. Martin

Professorial Lecturer W.N. LaForge

See the School of Business for programs of study leading to the degree of Bachelor of Business Administration.

4900 **Special Topics (3)** Staff

Experimental offering; new course topics and teaching methods.

4995 **Independent Study (arr.)** Staff

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

SUSTAINABILITY

The GW sustainability program is available to all undergraduates across the University as an 18-credit minor. The program involves all GW schools in both curriculum and research.

Three tracks—Environment/Earth Systems; Society and Sustainability; and Policy,

Organization, and Leadership—are offered, each with a choice of courses from several GW schools. Approved Topics courses and courses taken through study abroad can be part of the student's program. Requirements include experiential learning and at least one course

taken outside the student's home school and discipline. Specific requirements and lists of designated courses that pertain to the sustainability program can be found at sustain.gwu.edu/.

Prerequisite: Sust 1001 and permission of the program director are prerequisite to Sust 3095 through 3098.

Note: Students work with the Academic Program in Sustainability to arrange the internship/service experience that may be undertaken in Sust 3097 and 3098. For each of these courses there is an expectation of 40 hours of internship or service over the course of the semester. The courses may be taken for 0 credits if the student has already reached the 6-credit maximum of internship credits toward graduation.

1001 **Introduction to Sustainability** (3)

The concept of sustainability is both broad and specific as it is applied to areas ranging from social systems to law, engineering, public health, and natural systems. The course considers goals, principles, and practical applications, with a multidisciplinary perspective on major environmental and social issues growing out of these concerns.

3095 **Sustainability Fieldwork** (0 to 3)

Research in the field that might include such efforts as wildlife management, pollution evaluation, or surveys. Students complete a series of reflection essays throughout the semester.

3096 **Directed Research in Sustainability** (0 to 3)

Directed research with a GW faculty member or in a study abroad experience that might include laboratory research, archival work, or literature reviews. Students complete a series of reflection essays throughout the semester.

3097 Internship in Sustainability (0 to 3)

A paid or unpaid internship with an organization working to implement sustainability or sustainability policy. Students complete a series of reflection essays throughout the semester.

3098 Community Service in Sustainability (0 to 3)

Volunteer service with a nonprofit organization or federal agency working to implement sustainability or sustainability policy. Students complete a series of reflection essays throughout the semester.

THEATRE AND DANCE

Professors M.R. Withers, A.G. Wade, L.B. Jacobson

Associate Professors W.A. Pucilowsky, C.F. Gudenius, D.T.S. Burgess (*Chair*), J.I. Kanter,

M.A. Buckley

Assistant Professor S. Johannesdottir

Adjunct Professors A.C. Stokes, E. Kitsos-Kang

Professorial Lecturer K.Z. Keller

Bachelor of Arts with a major in theatre—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required course in related area—A course in dramatic literature and playwriting.
3. Required courses in the major—TrDa 1214, 2215, 2240, 1330, 2339 (3 credits), 3245–46, 4275; 6 credits in design/technical theatre courses; 9 additional credits in approved upper-division TrDa courses (TrDa 2180 and 2185, which are part of the dance curriculum, may be included here).

Bachelor of Arts with a major in dance—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.
2. Required courses in the major: 13 credit hours of courses in technique; 17 hours of courses in creative process/performance/theory; 3 hours of production design; 6 hours of electives. The department maintains a list of courses that fulfill these requirements.

Bachelor of Arts with a major in dramatic literature—The Department of Theatre and Dance and the Department of English offer an interdisciplinary major in dramatic literature. See Dramatic Literature.

Minor in Theatre—18 credit hours of theatre courses, including TrDa 3245–46.

Minor in Dance—18 credit hours of dance courses, including no more than 9 hours from TrDa 1017, 1150–71, 2160–73, and 3174–75, plus 3 hours from TrDa 2180, 2185, 2191, 3182, and 3186.

Special Honors—In addition to meeting the general requirements stated under University Regulations, candidates for graduation with Special Honors in Theatre or Dance must have a grade-point average of 3.4 in the major and complete TrDa 4599 with a grade of *A*. They must consult with a faculty advisor at the beginning of the second semester of the junior year to determine eligibility, area of study, and the director of the research or creative project.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Note: Courses in the 1000s series are primarily for nonmajors.

1015 Understanding the Dance (3)

Staff

The art of dance—a lecture and experiential approach to its cultural importance, history, and creative processes. The contributions of the choreographer and dancer to society. Attendance at performances and presentations, and viewing video. Laboratory fee. (Fall and spring)

1017 Movement Awareness (3)

Buckley and Staff

An experiential dance movement class that examines human movement and its connection to dance. Somatic concepts of Alexander, Feldenkrais, Bartenieff, and Body/Mind/Centering. (Fall and spring)

1020 Women and the Creative Process (3)

Buckley

Consideration of questions of aesthetics and creativity through the study of art produced by women since the mid-20th century. The creation, meaning, and impact of work across the fields of visual art, dance, theatre, and music.

(Fall)

1025 Understanding the Theatre (3)

Staff

The art of the theatre; its literature, history, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer. Attendance at assigned theatrical performances. Laboratory fee. (Fall and spring)

1035 Theatre Production (3)

Staff

Understanding of the basic elements of theatrical production (performance, technical and management) and the collaborative artist/artisan process through discussion, observation, and practical application. Laboratory fee.

(Fall and spring)

1150 **Beginning Ballet (1)** Staff

Introduction to classical ballet technique, including basic concepts of dynamic alignment, stretch, strength, and musicality. Laboratory fee.

1151 **Beginning/Intermediate Ballet (1)** Staff

1152 **Beginning Modern/Postmodern Dance (1)** Staff

Introduction to modern dance technique inclusive of basic concepts of dynamic alignment, stretch, strength, improvisation and musicality. Laboratory fee.

1153 **Beginning/Intermediate Modern/Postmodern Dance (1)** Staff

1170–71 **Intermediate Modern/Postmodern Dance (2 or 3 each)** Burgess and Staff

Recommended for students with previous dance experience in jazz, ballet, hip hop, modern, or other styles. May be repeated for credit. Prerequisite: TrDa 1170 to 1171, or permission of instructor. Laboratory fee.

1214 **Introduction to Acting (3)** Jacobson, Kanter, Wade, and Staff

Basic techniques of concentration, imagination, improvisation, and character development. Laboratory fee. (Fall and spring)

1330 **Basics of Production Design (3)** Gudenius and Staff

Basic elements of production design and technical execution. Laboratory required. Laboratory fee. (Fall and spring)

2160–61 **Intermediate Ballet (2 or 3 each)** Staff

May be repeated for credit. Prerequisite: TrDa 1151 to 2160, TrDa 2160 to 2161, or permission of instructor. Laboratory fee.

2162–63 **Intermediate/Advanced Ballet (2 or 3 each)** Staff

May be repeated for credit. Prerequisite: TrDa 2161 to 2162, TrDa 2162 to 2163, or permission of instructor. Laboratory fee.

2172–73 Intermediate/Advanced Modern/Postmodern Dance (2 or 3 each) Staff

May be repeated for credit. Prerequisite: TrDa 1171 to 2172, TrDa 2172 to 2173, or permission of instructor. Laboratory fee.

2179 Contact Improvisation (2) Staff

A movement form that arises from the point of contact between partners who explore gravity, space, and timing in the spontaneous moment-to-moment exchange of the dance. Exploring the improvisational state of body/mind through the use of imagery, tuning the senses, mindfulness practices, and play. Laboratory fee.

2180 Movement Improvisation and Performance (3) Withers

Exploring the body and its surroundings in movement, use of language, narrative, environments and contexts for creative expression, developing event and performance structures from improvisation. May be repeated for credit. Laboratory fee. (Spring)

2185 Trends in Performance Art (3) Withers

Study of the theory and practice of contemporary performance art movements and artists; political and artistic activism; scripting and scoring to create performance works based on a single art discipline or interdisciplinary arts. Laboratory fee. (Fall)

2191 Dance History (3) Buckley

The history of Western theatrical dance from the late 18th century to the present. The major choreographers and their dance works through readings, lectures, video, and discussion. (Spring)

2192 Repertory/Performance (1 or 2) Burgess, Withers

Participation in the processes of learning and performing dance repertory or new dance works. Audition required. Laboratory required. May be repeated for credit.

Laboratory fee. (Fall and spring)

2193–94 **Dance Styles** (arr.) Staff

Forms of theatrical dance other than ballet or modern, including African dance, Angola Capoeira, music theatre, Spanish dance, world dance, Middle Eastern dance, and others. May be repeated for credit provided the topic differs. Laboratory fee.

2215 **Introduction to Scene Study: Realism** (3) Jacobson, Kanter, Wade

Principles of role development, concentrating on 20th-century material. Prerequisite: TrDa 1214. Laboratory fee. (Fall and spring)

2216 **Scene Study: Voice and Character** (3) Jacobson and Staff

The practice and application of voice production with reference to skeletal alignment, breathing, resonance, and articulation. Emphasis on the process of voice production and its application to performance through work on scenes and monologues. Prerequisite: TrDa 2215. Laboratory fee.

2240 **Play Analysis** (3) Stokes

Same as Engl 2240.

2250 **Dramatic Writing** (3) Griffith

Same as Engl 2250.

2339 **Theatre Practicum** (1) Staff

Participation in department mainstage productions in a production or management capacity under the supervision of a member of the faculty. Prerequisite: TrDa 1330. After two practicums have been completed, participation may also include performance positions,

for which TrDa 1214 is prerequisite. May be repeated for a total of 6 credits. Laboratory fee. (Fall and spring)

2910 Gender and Indian Classical Dance (3) Staff

This history of Indian classical dance since the time of feudal, caste, and gender restraints. Indian dance technique training and discussion of texts and multimedia materials. Laboratory fee. (Spring)

3156 Dance in Community Settings (2–3) Burgess

Examination of dance in Washington area communities. Students are required to site visit and engage with individuals and organizations that focus on dance as it pertains to performance, therapy, management, and education. Participation in activities with a dance artist/practitioner or with a producing/service organization is required. Laboratory fee. (Spring)

3174–75 Advanced Modern/Postmodern Dance (2 or 3 each) Staff

May be repeated for credit. Prerequisite: TrDa 2173 to 3174, TrDa 3174 to 3175, or permission of instructor. Laboratory fee.

3182–83 Dance Composition (1 to 3 each) Withers

TrDa 3182: Problems in structural and conceptual aspects of constructing dances and shaping and forming movement materials. TrDa 3183: Emphasis on intention and content in making dances. Prerequisite: TrDa 2180; recommended: TrDa 2185. Laboratory fee. (Academic year)

3186 Dance Anatomy and Kinesiology (3) Burgess and Staff

An experiential and theoretical approach to dynamic anatomy and kinesiology as they pertain to the dancer. The student is encouraged to reach full movement potential in relation

to contemporary dance techniques, performance, and injury prevention. Laboratory fee. (Fall)

3220 **Scene Study: Contemporary Text (3)** Wade

Principles of role development in the works of post-war playwrights to include both the genres of comedy and drama and the stylistic directions of realism and post-realism. Playwrights chosen may include Beckett, Pinter, Albee, Stoppard, Mamet, Labute, Norman, Simon, and Henley. Prerequisite: TrDa 2215. Laboratory fee.

3221 **Scene Study: Classical Text (3)** Wade

Principles of role development in the works of pre-modern dramatists including Shakespeare and his contemporaries, the playwrights of the English Restoration, Molière, and other 17th- and 18th-century playwrights. Prerequisite: TrDa 2215. Laboratory fee.

3223 **Physical Performance Skills (3)** Staff

Introduction to a variety of techniques needed by actors and performers, including mime, clowning, slapstick, mask work, and basic stage combat skills. Prerequisite: TrDa 2215. Laboratory fee.

3225 **Stage Dialects (2)** Jacobson

Vocal production related to interpretation of specific texts. Focus on stage dialects and the interpretation of Shakespeare. Prerequisite: TrDa 2215. Laboratory fee.

3227 **Scene Study: Acting for the Media (2)** Wade

Techniques of acting for the camera; analysis of film and television scripts from actor's point of view. Prerequisite: TrDa 2215. Laboratory required. Laboratory fee.

3229 **Audition Techniques (3)** Staff

All aspects of the audition process: selection and rehearsal of audition monologues, handling of cold reading, etc. Prerequisite: TrDa 2215. Laboratory fee.

3240 **Introduction to Dramaturgy** (3) Kanter

Fundamentals of classical and contemporary dramaturgical practice, including analyzing plays, doing research, supporting directors and actors in rehearsal, writing program notes, and leading post-show discussions. Same as Engl 3240. (Spring)

3245–46 **History of the Theatre** (3–3) Kanter, Stokes

A dramaturg's approach to case studies of theatre in historical context. TrDa 3245: ancient Greece through the 17th century. TrDa 3246: the 18th century through the present. (Academic year)

3248 **Theatre Criticism** (3) Staff

Discussion and witnessing of plays in performance, resulting in written criticism modeled on contemporary journalistic practices. Prerequisite: TrDa 3245 or 3246 or TrDa/Engl 2240. Laboratory fee. (Spring)

3250 **Intermediate Dramatic Writing** (3) Griffith, Stokes

Same as Engl 3250.

3331 **Introduction to Lighting** (3) Gudenius

Lecture (2 hours), laboratory (1 hour). Theories and practicum in lighting for theatre and dance. Laboratory fee. Prerequisite: TrDa 1330.

3332 **Makeup Design** (3) Staff

Theory and practicum in the art of makeup design, including latex and crepe hair. Laboratory fee. Prerequisite: TrDa 1330.

3333 **Stage Management** (3) Staff

The role and function of the stage manager in theatrical production. The basic skills needed to begin work in stage management. Emphasis on organization, documentation, and dissemination of information. Prerequisite: TrDa 1330. Laboratory fee.

3335 Introduction to Scene Design (3) Gudenius

Fundamental study of scenic design, including historic overview, basic drawing, and rendering techniques, through the use of various mediums and script analysis. Laboratory fee. Prerequisite: TrDa 1330.

3336 Introduction to Costuming (3) Staff

History of fashion in Western civilization from ancient Greece to the 20th century. Fundamental study of costume construction through specific projects. Costume construction. Prerequisite: TrDa 1330. Laboratory fee.

4184 Choreographic Projects (1–3) Withers, Burgess

Create a dance or a performance work of individual design, including casting, rehearsal procedures, staging aspects, and public presentation. Prerequisite: TrDa 3182; recommended: TrDa 1330, 2185. May be repeated for credit. Laboratory fee.

4275 Directing for the Theatre (3) Kanter

Fundamentals of script analysis, staging, casting, and rehearsal techniques. Prerequisite: TrDa 1214, 1330; TrDa/Engl 2240 or 3240. Laboratory fee.

(Fall)

4338 Scene Painting (3) Staff

The techniques and materials used in creating character in the various elements of set design. Methods include set preparation, coating, mixing, palette preparation, spraying, transfer, texturing, finishing, and wallpapering. Prerequisite: TrDa 1330. Laboratory fee.

4595 **Selected Topics** (1 to 3) Staff

Topics of current interest in theatre or dance. Topics (and course fee, when charged) announced in the Schedule of Classes. May be repeated for credit provided the topic differs. Laboratory fee.

4596 **Independent Study** (1 to 6) Staff

Independent research and special projects. Open to qualified juniors or seniors majoring or minoring in theatre or dance. Before students are permitted to register for TrDa 4596, they must submit a written proposal of the plan of study and obtain approval of the faculty member who is directing the study and the department chair.

4598 **Internship** (3 or 6) Staff

Open to qualified seniors majoring or minoring in theatre or dance. Work placements with not-for-profit and commercial theatre and dance organizations for an approved number of hours per week. Admission requires departmental approval. May be taken for a maximum of 6 credits.

(Fall and spring)

4599 **Honors Thesis** (3) Staff

Directed research and/or creative project. Open to qualified seniors by permission. Arrangements must be made with a sponsoring faculty member in the department and applications must be completed early in the second semester of the junior year. (Fall and spring)

TOURISM AND HOSPITALITY MANAGEMENT

Faculty Director L. Yu

See the School of Business for programs of study leading to the degree of Bachelor of Business Administration and the combined degree program leading to the Bachelor of Business Administration and Master of Tourism Administration.

3001 **Introduction to Tourism and Hospitality Management (3)** Elliott, Levy, and Staff

Historical overview and survey of the tourism and hospitality industry, with emphasis on the travel market, delivery of hospitality services, professional roles, and emerging trends. (Fall, spring, and summer)

3002 **Passenger Transportation Systems (3)** Staff

Survey of passenger transportation modes. Emphasis on airline operations, marketing communications, and distribution channels. (Fall)

3101 **Sport and Event Business Enterprises (3)** Staff

An overview of business opportunities related to sport and events. Emphasis on sport and event facilities and event management; product manufacturing, merchandising, and licensing; media and publications; and athlete representation. (Fall)

3102 **Sport and Event Marketing (3)** Delpy Neirotti

Application of marketing theories and practices to sport and events. Sponsorship, endorsement proposals, public relations, and promotional campaigns. Prerequisite: BAdm

3401. (Spring)

3301 **Hospitality Industry Management (3)** Levy

An overview of the basic principles and practices involved in the management, operation, marketing, and financing of hotels, restaurants, and other hospitality goods and services. (Fall)

3302 **Financial Management in the Tourism and Hospitality** Yu

Industry (3)

Basic principles of planning and managing tourism resources, developments, and facilities in relation to investment constraints and opportunities. Financial monitoring and control of hospitality facilities and related leisure services. Prerequisite: BAdm

3501. (Spring)

3303 **International Experiences** (1 to 6) Delpy Neirotti

Travel to a foreign country for study of a specific topic. May be repeated for credit with permission of the advisor. (Fall, spring, and summer)

4101	Issues in Sport and Event Management (3)	Staff
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A discussion of policies, procedures, organizational structures, issues, and trends in sport and events, from amateur to professional. (Spring)

4102	Practicum (1 to 3)	Staff
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Fieldwork, internship, and/or instructional practice, including conference and/or seminar. Admission by permission of instructor. May be repeated once for credit with permission of advisor. (Fall, spring, and summer)

4301 **Travel Marketing Communications (3)** Elliott

Review of basic advertising, public relations, and sales techniques, applied to the tourism and hospitality industry. Current practices and case studies.

(Spring)

4900 **Special Topics** (1 to 3)

Staff

Experimental offering; new course topics and teaching methods. May be repeated once for credit. (Fall, spring, and summer)

4995 **Independent Study** (1 to 3)

Staff

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

TURKISH

See **Classical and Near Eastern Languages and Literatures**.

UNIVERSITY WRITING

Associate Professors D. Malone-France (*Director*), R. Riedner, P. Ryder, A. Wilkerson

Assistant Professors J. Donovan, S. Friedman, C. Gamber, C. Hayes, R. Kristensen, M.

Mullen, S. Salchak, H. Schell, C. Smith, M. Svoboda, P. Troutman, Z. Wolfe, C. Zink

Teaching Instructors E. Bliss, K.A. Larsen, R.A. Marcus, D.P. Myers, P.S. Presser, M.

Riley, L.B. Sallinger

The University Writing Program provides comprehensive writing instruction. All

undergraduates take UW 1020, followed by two Writing in the Disciplines (WID) courses. These are regular, content-area courses that include a writing component and are offered by departments and programs throughout the University. Ideally, students will complete WID courses during their sophomore and junior years. Courses indicated with “W” in the Schedule of Classes fulfill the WID portion of University Writing Program requirements. WID courses must total a minimum of 6 credits.

1020 **University Writing** (4)

University-level, independent research and writing. Learning to frame research questions, identify and analyze supportive and contradictory evidence, employ a variety of research methods, and use the ideas of other writers appropriately. Developing strategies to draft and revise clear, engaging prose for a variety of purposes and audiences. Thematically oriented seminars; texts and course topics vary among instructors. For topics see www.gwu.edu/~uwp/fyw/uw20-courses.html. (Fall and spring)

2020 Advanced Topics in Writing (3)

For a variety of purposes and audiences, students frame scholarly research questions, identify and analyze supportive and contradictory evidence, employ a variety of research methods, and use the ideas of other writers appropriately. Focus on the norms of writing in particular fields, including rhetorical approaches and stylistic conventions.

2111 Preparation for Peer Tutors in Writing (3)

For undergraduates accepted as tutors in the Writing Center: study and practice of techniques for prewriting, writing, and revision; readings on collaborative learning, the composing process, composition theory, cognitive psychology, critical thinking, and the teaching of writing; observation and exercises in writing, peer review, and tutoring. Limited to 15 students.

(Fall)

VIETNAMESE

See **East Asian Languages and Literatures**.

WOMEN'S LEADERSHIP PROGRAMS

Director R.S. Heller

The courses listed below are restricted to students who participate in the Elizabeth J.

Somers Women's Leadership Programs on the Mount Vernon Campus.

1020 WLP Humanities Seminar (3)

A writing-intensive seminar that emphasizes critical reading skills, concepts of disciplinarity, and processes of producing and legitimating knowledge. Texts and emphasis vary according to cohort.

1101–2 Women and Leadership (3–3)

Women's status and leadership roles examined from various perspectives and various fields of endeavor, such as science and technology, the arts, international leadership, and U.S. politics and policy. Prerequisite to WLP 1102: WLP 1101 or permission of the instructor. Concurrent registration in WLP 1110–11 is required.

1110–11 Women and Leadership I Symposium (1–1)

A series of special programs that complements WLP 1101–2. Concurrent registration in WLP 1101–2 is required.

1120–21 Women and Leadership II Symposium (0 or 1 each)

A series of special programs and experiential learning. Concurrent registration in WLP 2151 is required for WLP 1120.

2151 Theory and Practice of Women's Leadership (3)

Contemporary theories of leadership; factors affecting women as leaders; building leadership skills through experiential learning. Prerequisite: WLP 1102 or permission of instructor. Same as Psyc 3151.

4198 Independent Study (3)

WOMEN'S STUDIES

Associate Professors C.E. Harrison, C. Deitch, D. Moshenberg (*Director*), A. Zucker, R.

Riedner, K. Pemberton

Assistant Professor J. Nash

Adjunct Professors B. Morris, T. Ramlow

Professorial Lecturer M. Frost

Committee on Women's Studies

N. Cahn, E. Chacko, L. Chang, K. Daiya, C. Deitch, C. Gamber, B. Gault, C.E. Harrison, H.

Hartmann, L. Jacobson, D. Moshenberg, J. Nash, B. Obler, K. Pemberton, R. Riedner, G.

Weiss, S. Wolchik, A. Zucker

Bachelor of Arts with a major in women's studies—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College of Arts and Sciences.

2. Prerequisite course—WStu 1020.

3. Required—30 credit hours consisting of WStu 2120, 2125, 4199, plus seven courses from the four groups that follow, with a minimum of one course chosen from each group. A given course can fulfill only one group requirement. With approval of the program advisor, courses with appropriate subject matter may be substituted for those specified.

Women's studies—WStu 3170, 4183, 3195.

Diversity/cross-cultural studies—AmSt/Hist/WStu 3362; Anth/WStu 2121;
Chin/WStu 3136; Engl 1611; Phil 2125; Span 3570.

Humanities—AmSt/Hist/WStu 2380, 3352–53, 3362; Chin/WStu 3136; Engl 1611, 3560, 3840; Hist 2410; Phil 2125; Rel/WStu 3281, 3981; Span 3570.

Social science—Anth/WStu 2121; Anth 3513, 3504, 3507; Psyc 3150; Psyc/WStu 3152; Soc 2166, 2175.

Combined Bachelor of Arts with a major in women's studies and Master of Arts in the field of women's studies or in the field of public policy with a concentration in women's studies—Students interested in either of these combined degree programs should consult the Women's Studies Program office for requirements by the beginning of their junior year.

Special Honors—For Special Honors in women's studies, a major must meet the general requirements stated under University Regulations, attain a grade-point average of at least 3.7 in courses counted for the women's studies major and 3.3 overall, receive a grade of *A* in WStu 4199, and submit an honors paper to the Women's Studies Program. Upon faculty review of the honors paper, the student may be recommended for graduation with Special Honors.

Minor in women's studies—18 credit hours, including WStu 2120 and 2125, plus four elective courses approved by the advisor. Elective courses that are typically approved are listed under the women's studies major, above. Pertinent courses are frequently taught as departmental topics courses.

Minor in LGBT and sexuality studies—18 credit hours selected from a list of designated courses. See www.gwu.edu/~wstu.

1020 Women in Western Civilization (3)

Morris and Staff

Exploration of critical periods of intellectual and cultural change in Western societies as influenced by and affecting women. Examination of images of women and of changing ideal types of femininity and masculinity. Aspects of law, religion, art, culture, work, and politics in relation to these topics. Same as Hist 1020. (Fall)

2120	Introduction to Women's Studies (3)	Moshenberg and Staff
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A multidisciplinary examination of historical conditions, cultural norms, and social institutions that define women's status in Western culture. Experiences of girls and women in various racial-ethnic, class, and age groups. Alternative visions for women's (and, by implication, men's) roles and status. Sophomore standing required. (Fall and spring)

2121 **The Anthropology of Gender: Cross-Cultural Perspectives (3)** Staff

Anthropological representations of gender relations in “other” cultures have provided important case material for feminist theorizing of sex differences and gender roles and statuses. How a cross-cultural approach can inform our understanding of gender. Same as Anth 2501. (Spring)

2125 **Varieties of Feminist Theory (3)** Deitch, Nash

Classical and contemporary texts on feminist explanations of women's status.

Relationships within the sex/gender system and arrangements based on class and race.

Evaluation, through the lens of feminist theory, of several academic disciplines in the sciences, social sciences, and humanities. Prerequisite: WStu 1020 or 2120 or permission of instructor. (Spring)

2135 **A Study of Women and Media (3)** Gamber and Staff

The role media plays in women's lives. The limits and effects of a "dominant" media; representations of women in print media and television, especially advertising, and in books and film. How women have attempted to articulate a culture that serves their personal, political, and social interests.

(Summer)

2380 **Sexuality in U.S. History (3)** Staff

Same as AmSt/Hist 2380.

3136 **Chinese Women in Myth, Literature, and Film (3)** Frost

Same as Chin 3136.

3152 **Women and Psychology (3)** Zucker

Same as Psyc 3152.

3170 **Selected Topics (3)** Staff

Examination and analysis of central issues in women's studies, such as women and difference, women in media, women and violence, athletics and gender. Topic changes each semester; may be repeated for credit.

(Fall and spring)

3195 **Undergraduate Research (1 to 3)** Staff

A written proposal approved by the member of the faculty who will supervise the research is required prior to registration.

3281 **Women in Judaism (3)** Staff

Same as Rel 3281.

3352–53 **Women in the United States (3–3)** Murphy, Harrison

Same as Hist/AmSt 3352–53.

3362 **Black Women in U.S. History (3)** Chapman

Same as AmSt/Hist 3362.

3481 **Women in Islam (3)** Pemberton

Same as Rel 3481.

3530 **Women in Africa (3)** Staff

Same as Hist 3530.

3881 **Women, Gender, and Religion in China (3)** Staff

Same as Rel 3881.

3981 **Women in Western Religion (3)** Pemberton

Same as Rel 3981.

4183 **Practicum in Women's Studies (3)** Deitch

Study of the changing status of women through supervised assignment to public and private agencies engaged in policymaking, education, political action, and research. Usually for seniors. Placement arrangements must be made the semester prior to registration; departmental permission is required.

(Spring)

4199 **Senior Seminar (3)** Staff

For students completing a major or minor in women's studies. Writings of contemporary scholars and writers whose work provides critical frameworks for feminist scholarship and research. Individual or collaborative research projects are presented and submitted as written papers. (Fall)

YIDDISH

See **Classical and Near Eastern Languages and Civilizations**.

University Regulations

UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the requirements and regulations of the school in which they are registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reapply and, if readmitted, continue their program only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the faculty) for subsequent registration in the University.

Registration

Information on registration procedures is stated on the Registrar's Office website and in the Schedule of Classes, which is available in advance of each semester.

Registration in courses is open only to those persons formally admitted to the University by the appropriate admitting office and to continuing students in good standing.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the school in which they are registered in this University. With the exception of students enrolled in a joint degree program, registration in more than one school of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until all financial obligations

have been met. Individuals without a valid registration may not attend class or earn any course credit.

Eligibility for Registration—Registration for the following categories of on-campus students is held on the days of registration indicated in the Schedule of Classes. A student who is suspended or whose record is encumbered for any reason is not eligible to register. Registration in a given course may be denied to nondegree students by the Office of Non-Degree Students when space is needed for degree candidates.

New Student—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration. Registration for new students is typically conducted on stated days as part of the Colonial Inauguration orientation program.

Readmitted Student—A student previously registered in the University who was not registered during the preceding semester must apply for and be granted readmission by the appropriate admitting office before being eligible for registration.

Continuing Student—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

Completion of Registration—Registration is not complete until financial obligations have been fulfilled. Students who do not complete their financial obligations in a timely manner may have their registration canceled and will not be permitted to attend class.

Registration for Consortium Courses—Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office

of the Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar's Office. Detailed information concerning Consortium policy and procedures is printed in the Schedule of Classes and is available on the Registrar's Office website.

Adding and Dropping Courses

During the registration period (before the end of the second week of classes) students may add or drop courses using GWeb. After the second week of classes, students who wish to add or drop a course must complete a Registration Transaction Form and submit the form to the office of their dean; forms are available on line, at deans' offices, and in the Office of the Registrar. Adding a course after the second week requires a signature of the instructor or other authorized member of the department.

A course dropped during the first four weeks of classes will not appear on the student's transcript. A course dropped after the fourth week but before the end of the eighth week will be assigned a notation of *W* (Authorized Withdrawal).

The deadline for dropping a course without academic penalty is the end of the eighth week of classes in the fall and spring semesters. After the end of the eighth week of classes, dropping a course without academic penalty is only possible after the student presents a petition to the dean and receives written permission.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations in this Bulletin. Failure to withdraw by

these procedures can result in an extended financial obligation and the recording of a grade of *F* (Failure) or a notation of *Z* (Unauthorized Withdrawal).

Changes in Program of Study

Changes Within a School—A student may not substitute one course for another within an established program of study or change status from credit to audit or from audit to credit without the approval of the dean of the school in which he or she is registered. Change from one major field to another within the same school may be made with the approval of the dean.

Transfer Within the University—Application for transfer to another school must be made to the appropriate admitting office on the form provided by the office concerned. Students transferring within the University are advised to study carefully the requirements listed below under Graduation Requirements and to note that unless otherwise specified, in all undergraduate divisions, 30 credit hours, including at least 12 credit hours in the major field, must be completed while registered in the school from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly the requirements that must be fulfilled. A maximum of 45 credit hours earned through the Office of Non-Degree Students may be applied toward a bachelor's degree in the degree-granting schools of the University.

Grades

Grades are made available to students through the Office of the Registrar after the close of each semester. The following grading system is used: *A*, Excellent; *B*, Good; *C*, Satisfactory; *D*, Low Pass; *F*, Fail; other grades that may be assigned are *A*–, *B*+, *B*–, *C*+, *C*–, *D*+, and *D*–. Symbols that may appear include *AU*, Audit; *I*, Incomplete; *IPG*, In

Progress; *W*, Authorized Withdrawal; *Z*, Unauthorized Withdrawal; *P*, Pass; *NP*, No Pass; *R*, Need to Repeat Course.

Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of *D–* or better was received, unless required to do so by the department concerned. A written statement, indicating that the student is required to repeat the course, must be submitted to the student's dean by the appropriate department chair.

The symbol of *Z* is assigned when students are registered for a course that they have not attended or have attended only briefly, and in which they have done no graded work. At the end of the academic year, students' records are reviewed; if there is more than one *Z* per semester, a student's record will be encumbered until released by the student's advisor or academic dean. The symbol of *Z* is not a grade but an administrative notation.

Incompletes—The symbol *I* (Incomplete) indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required course work during the semester of enrollment. At the option of the instructor, the symbol *I* may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. This symbol may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*, Failure. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change, which in all cases will include the symbol *I*. The course work must be completed within the

designated time period agreed upon by the instructor and student, but (except in the School of Business) no more than one calendar year from the end of the semester in which the course was taken. In the School of Business, the symbol *I* must be changed by a date agreed on by the instructor and the student, but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the symbol *I* is assigned. All students who receive an Incomplete must maintain active student status during the subsequent semester(s) in which course work is being completed. If not registered in other classes during this period, the student must register for Continuous Enrollment status.

When work for the course is completed, the instructor will complete a grade change form and turn it in to the Office of the Registrar. The grade earned will be indicated in the form of *I*, followed by the grade. The indication of *I* cannot be removed and remains on the student's permanent academic record even after the course has been successfully completed. If work for the course is not completed within the designated time, the grade will be automatically converted to a grade of *IF*, Incomplete/Failure, 0 quality points, and the grade-point average and academic standing recalculated.

The Grade-Point Average—Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: *A*, 4.0; *A*−, 3.7; *B*+, 3.3; *B*, 3.0; *B*−, 2.7; *C*+, 2.3; *C*, 2.0; *C*−, 1.7; *D*+, 1.3; *D*, 1.0; *D*−, .7; *F*, 0, for each credit hour for which the student has registered as a degree-seeking student. Although credit value for a course in which a grade of *F* is earned appears on the transcript for the purpose of calculating the grade-point

average, no academic credit is awarded. In the case of a student who is allowed to repeat a course, the first grade received remains on the student's record and is included in the grade-point average. Courses marked *AU*, *CR*, *I*, *IPG*, *P*, *NP*, *R*, *W*, or *Z* are not considered in determining the average, except that courses marked *I* will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

Latin Honors

Bachelor's degrees with honors are awarded to students whose academic records give evidence of particular merit. The student's grade-point average determines the level of honors as follows: *cum laude*, 3.4–3.59; *magna cum laude*, 3.6–3.79; *summa cum laude*, 3.8–4.0. The grade-point average includes all course work completed at GW. To be eligible for an honors designation, a student must complete at least 60 hours of course work with letter grades (grades included in calculating the grade-point average) at GW.

The grade-point average is calculated by the Office of the Registrar, and the honors designation is entered on the transcript and diploma of those students who earn an honors designation. If Latin honors are entered in the commencement program, honors status will be determined on the basis of work completed by the end of the seventh term and entered only for those students who have completed seven-eighths of the credit hours required for the degree. Latin honors indicated on the diploma are calculated on the basis of all course work completed. The diploma and transcript are the official indication that a degree was conferred and Latin honors awarded.

Special Honors

Special Honors may be awarded by the faculty to any member of the graduating class for outstanding achievement in the student's major field on recommendation of the major department. The student must fulfill all of the following requirements: (1) Candidacy for Special Honors must be approved by the faculty member representing the major department or field not later than the beginning of the senior year. (2) Such other conditions as may be set at the time the candidacy is approved must be met. (3) At least one-half of the courses required for the degree must have been completed at GW. (4) The specific minimum requirement of the school in which the student is registered must be fulfilled as follows: (a) Columbian College of Arts and Sciences—a grade-point average of 3.0 on all course work taken at GW; (b) the Elliott School of International Affairs—a grade-point average of 3.4 on all course work taken at GW; (c) the School of Public Health and Health Services—a grade-point average of 3.25 on all course work taken at GW. Special Honors awards appear on the transcript.

Double Majors

Students can declare no more than two majors; they can pursue minors or secondary fields in addition to the two majors if they wish but are generally advised against pursuing too many specializations.

Students who graduate with the requisite hours for one degree, having fulfilled the major requirements in more than one department, program, and/or school, will receive one degree. They must select a primary degree and major, as only the primary degree will show on the diploma, along with the two majors.

Students who complete the major requirements in a school other than their own in addition to the major requirements in the school in which they are enrolled (assuming that

there is an agreement allowing such between the relevant schools) will receive the degree in the major of their own school and a notation on the transcript and diploma that testifies to completion of requirements for a secondary major. It is understood that requirements of the secondary major do not include the general education requirements of the second school.

Students who complete the major requirements for a degree different from the one they will receive in their own school will receive the degree of the relevant major in their own school. For example, a SEAS student completing the degree requirements for a B.S. in computer science and the major requirements for a B.A. in fine arts will receive a B.S. in computer science with a secondary major in fine arts.

Students who complete two majors in the same school also receive one degree with two majors; if one major leads to a B.A. and one to a B.S., the student must declare a primary major and will receive the degree associated with that major.

Double Degrees

In order to receive two bachelor's degrees from GW simultaneously, a student must first have applied to and been admitted by the school or college that offers the second degree. To apply for the second degree, the student must have an overall GW grade-point average of at least 3.3 and have not completed more than 90 credits toward graduation. The student must satisfy the general and related requirements for the first degree and the major requirements for both degrees. In the process, the student must complete at least an additional 30 credits, chosen in consultation with the student's advisor from each major, program, or school, beyond the credits required to earn one degree. At least 90 of the total credits required for the two degrees must be earned at or through the University. Different requirements apply for specific joint degree and dual degree programs.

Graduation Requirements

Degrees are conferred in January, May, and August. To be eligible for graduation a student must have met the admission requirements of the school in which registered; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree as stated in this bulletin; filed an application for graduation by the published deadline date; and be free from all indebtedness to the University. Enrollment is required for the semester or summer at the close of which the degree is to be conferred, and all degree requirements must be completed by the last day of final examinations for that semester or summer session. Students who pursue a double major across two schools must complete the primary major in their own school in order to graduate. A second major may supplement the primary major but may not substitute for it.

Participation in the Commencement Ceremony—Participation in the annual commencement ceremony held in May is open to students who have applied to graduate in the current spring semester or who graduated the preceding fall semester or summer session. Students, graduate or undergraduate, who need no more than 9 credit hours to complete their degree requirements, may participate in May commencement ceremonies if there is a reasonable expectation that they will be able to obtain the needed credits during the following summer. The maximum of 9 credit hours is firm and not subject to petition. Summer graduates who elect to attend the preceding May ceremony must apply for graduation no later than February 1. Students who apply after the published deadlines are not guaranteed commencement materials.

Continuous Enrollment Status

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. A student is considered to be continuously enrolled when registered for courses through GW or when registered for Continuous Enrollment and engaged in and appropriately registered for activities such as the following, with the prior approval of the school in which the student is enrolled: cooperative work semester; study abroad program; attendance at another institution with prior approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete or In Progress was received; or non-course instructional activities unique to the particular school. This status is generally limited to one year. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

Leave of Absence

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

Policy Regarding Students Called to Active Military Duty

Any student who is a member of a military reserve unit or the National Guard and is activated or called to active duty early in a semester or summer session automatically will be entitled to a full refund of all tuition and fees that he or she has paid toward the expenses of that academic term. If the notification of the call to active duty comes after the mid-term examinations or after other substantial graded work has been completed, the student will have the option of either taking a full refund of tuition and fees or taking an Incomplete in his or her courses with the privilege of returning to complete all required course work at some future date without payment of any further tuition and fee charges. It is the responsibility of the student to present evidence of his or her activation to the Office of Student Accounts and to request the appropriate refund.

Should a degree student called up for active duty find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specified period of time, generally limited to one calendar year. Deans are encouraged to grant any request to extend the leave of absence for longer than the customary period should military service require an absence of more than one year. All students on active duty will be automatically exempted from the request for a voluntary library contribution without requiring any communication from them or their initials on the bill.

Complete Withdrawal From the University

A degree-seeking student who wishes to withdraw from all courses during a given semester must complete a Complete Withdrawal Form and submit it to the Office of the Registrar. Forms are available on line, at deans' offices, and in the Office of the Registrar. The deadline for complete withdrawal from all courses without academic penalty is the end of

the ninth week of classes. Complete withdrawal after the ninth week requires a petition to the dean.

All charges for courses from which the student withdraws are subject to the refund policy found at the Registrar's Office website. Failure to complete a Complete Withdrawal Form can result in an extended financial obligation and the recording of grades of *F* (Failure) or notations of *Z* (Unauthorized Withdrawal).

The University is authorized to award the degree of Associate in General Studies under designated circumstances. This degree may be awarded to students in good standing who must leave GW after completing 60 credit hours in residence in a degree-granting GW school; students should consult the dean of their school about additional requirements for awarding of the Associate in General Studies.

University Policies and Definitions

University Policy on Equal Opportunity—The George Washington University does not unlawfully discriminate against any person on any basis prohibited by federal law, the District of Columbia Human Rights Act, or other applicable law, including without limitation, race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, or gender identity or expression. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment.

Inquiries concerning this policy and federal and local laws and regulations concerning discrimination in education and employment programs and activities may be directed to the University's Office of Equal Employment Opportunity and Affirmative Action, Suite 320, 2033 K Street NW, Washington DC 20052, (202)994-9656. Inquiries may also be directed

to the U.S. Department of Education Office for Civil Rights, the U.S. Equal Employment Opportunity Commission, or the applicable state or local agency (for example, the District of Columbia Office of Human Rights).

Questions regarding protections against discrimination on the basis of sex may be directed to the University's Title IX Coordinator, the Vice Provost for Diversity and Inclusion, Rice Hall 813, 2121 Eye Street NW, Washington DC 20052, (202)994-7440.

Questions regarding the protections against discrimination on the basis of disability may be directed to the University's Disability Services Coordinators. Students may contact the Associate Dean of Students, Administrative Services, Office of the Dean of Students, Rice Hall 401, 2121 Eye Street NW, Washington DC 20052, (202)994-6710, and other members of the university community may contact the Executive Director of Equal Employment Opportunity and Affirmative Action, Suite 320, 2033 K Street NW, Washington DC 20052, (202)994-9633.

To request disability accommodations, students should contact the Office of Disability Support Services at (202)994-8250 or dss@gwu.edu. Employees and other members of the University community should contact the Office of Equal Employment Opportunity and Affirmative Action at (202)994-9656 or eeo@gwu.edu.

Study Abroad—Undergraduates who wish to study abroad during the academic year should contact the Office for Study Abroad concerning eligibility, appropriate procedures, and requirements for participation. Participants are billed GW charges for study abroad, rather than fees indicated by the visited school or program. To be eligible for the transfer of academic credit from study abroad, GW students must select a program from the University's authorized list of study abroad programs. Students must have a 2.75

cumulative grade-point average at the time of application and must have completed 45 credit hours prior to departure. Transfer students must complete one full semester at GW prior to application. Students who have a significant disciplinary history or who are on academic or disciplinary probation at the time of application are not eligible to study abroad. All programs of study abroad must be approved on the required forms prior to departure. Non-GW course credits earned in authorized programs with a *C* or above are transferable toward the appropriate degree at GW, provided there is no duplication of work done previously and faculty have designated each course with a GW course equivalent. Participants agree to abide by all procedures and regulations for study abroad as indicated in the Study Abroad Handbook and Participation Agreement distributed through the Office for Study Abroad. In addition to academic year programs, study abroad is available at varying locations during the summer.

Non-Degree Students—The Office of Non-Degree Students makes main-campus, credit-bearing courses available to those who are not currently degree candidates at this University. Non-degree students are allowed a maximum per semester of 12 credits at the graduate level and 18 at the undergraduate level, except in special circumstances as approved by the director. Medical and law courses are not available to non-degree students.

Non-degree applicants must have appropriate academic preparation prior to enrollment. Prerequisites are specified in this Bulletin either in the course description or as a note preceding course descriptions of a given department. Contact the department concerned for further information regarding appropriate academic background for a particular course. An applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been

suspended from any educational institution for poor scholarship will not be eligible to enroll as a non-degree student for one calendar year after the effective date of the suspension. An applicant who has been denied admission within this University will not be eligible to enroll as a non-degree student for the same semester for which the application was denied.

Applications and information on registration are available online www.gwu.edu/nondegree. Prospective and registered students should acquaint themselves with the regulations concerning attendance and withdrawal stated in this section or at www.gwu.edu/nondegree.

If a non-degree student takes a course for which the symbol *I* (Incomplete) is assigned, the instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year becomes a grade of *IF* on the student's record.

Academic Integrity—The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations. Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels. The University Code of Academic Integrity can be found at <http://www.gwu.edu/~ntegrity/code.html>.

Patent and Copyright Policies—Students who produce creative works or make scientific discoveries while employed or supported by the University or through substantial use of University resources are subject to the University's patent and copyright policies (see <http://www.gwu.edu/~research/policies.htm> under Intellectual Property).

Human Research Requirements—Students who are planning to conduct research involving the use of human subjects (for a thesis, dissertation, journal article, poster session, etc.) must obtain Institutional Review Board (IRB) approval before collecting any data. In order to receive this approval, contact the Office of Human Research (Ross Hall, Suite 712, 202-994-2715, or see www.gwumc.edu/research/human.htm) to submit the study for the approval process.

Use of Correct English—A report regarding any student whose written or spoken English in any course is unsatisfactory may be sent by the instructor to the dean of the school, who may assign supplementary work, without academic credit, varying with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the dean.

Name of Record—A student's name of record includes the first name, middle initial or full middle name, and the family name. Nicknames may not be used. The University will change the name of a currently enrolled student on its official records but will require satisfactory evidence of a legal basis for the change. The diploma is awarded under the official name of record at the time of graduation.

Student Status—For the purpose of defining student status, undergraduates taking 12 or more credit hours per semester are considered to be full time, those taking 6 to 11 credits

per semester are considered to be half time, and all others are considered to be part time. Generally, a student becomes a sophomore upon completion of 30 credits, a junior upon completion of 60 credits, and a senior upon completion of 90 credits.

Attendance—Students may attend only those classes for which they are officially registered. Regular attendance is expected. Students may be dropped from any course for undue absence. A student suspended for any cause may not attend classes during the period of suspension. Students are held responsible for all of the work of the courses in which they are registered, and all absences must be excused by the instructor before provision is made to make up the work missed.

Credit—Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the school concerned. Credit that has been applied to the completion of a degree may not subsequently be applied to another degree.

Auditing—A person who has been admitted to the University may be registered, with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate. A student may not change from audit to credit status or vice versa after the end of the eighth week of classes.

Earning Transfer Credit after Matriculation—Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. Up to 30 credit hours may be transferred through GW-approved study abroad at non-GW institutions. In addition, as a part of the University

residence requirement, no more than 9 credit hours in total can be transferred from colleges or universities after matriculation except by special permission of the appropriate dean. No transfer from two-year institutions is allowed after a student has earned 60 credit hours toward a degree.

Transcripts of Record—Official transcripts of student records are issued upon written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. A nominal fee is charged for each official transcript. Unofficial copies of transcripts are available to students, by written request, at a nominal fee. Partial transcripts are not issued. Students have access to their unofficial student record through the GWeb Information System.

Student Conduct—All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained from the Office of the Dean of Students or from the offices of the academic deans. Sanctions for violation of these regulations may include permanent expulsion from the University. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

Right to Dismiss Students—The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

Right to Change Rules and Programs—The University reserves the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine. The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

University Policy on the Release of Student Information—The Family Educational Rights and Privacy Act (FERPA) applies to institutional policies governing access to and release of student education records.

The University may release the following directory information upon request: name, local address including e-mail, and telephone number; name and address of emergency contact; dates of attendance; school of enrollment; field of study; enrollment status; credit hours earned; degrees earned; honors received; participation in University-recognized organizations and activities (including intercollegiate athletics); and height, weight, and age of members of athletic teams, as well as likenesses used in University publications. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar.

The University's full policy statement on the release of student information is published in the *Guide to Student Rights and Responsibilities*, available in the Office of the Dean of Students or the offices of the academic deans. The full statement also appears on the Registrar's Office website.

Student Identification Number/Social Security Number—The University has converted from use of the Social Security Number (SSN) to identify records pertaining to individual students, although the SSN is still needed to identify the student for purposes of financial aid eligibility and disbursement and repayment of financial aid and other debts

payable to the University. The SSN is required when applying for financial aid. The Internal Revenue Service requires the University to file information that includes a student's SSN and other information such as the amount paid for qualified tuition, related expenses, and interest on educational loans. This information is used to help determine whether a student, or a person claiming a student as a dependent, may take credit or deduction to reduce federal and/or state income taxes. Many efforts are made to protect the privacy of this number, and a student may request an alternate personal identifier. Further information may be obtained by contacting the Office of the Registrar.

Property Responsibility—The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Department.

Faculty

FACULTY AND STAFF OF INSTRUCTION 2012–2013

(as of Fall 2012)

Columbian College of Arts and Sciences

School of Business

Graduate School of Education and Human Development

School of Engineering and Applied Science

Elliott School of International Affairs

EMERITI

Fred Paul Abramson, *Professor Emeritus of Pharmacology*

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Licence és Lettres 1962, University of Paris; Ph.D. 1970, McGill University, Canada

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DEGREES OFFERED BY THE GEORGE WASHINGTON UNIVERSITY

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School of Medicine and Health Sciences: Bachelor of Science in Health Sciences (B.S.H.S.), Master of Science in Health Sciences (M.S.H.S.), Doctor of Physical Therapy (D.P.T.), and Doctor of Medicine (M.D.)

Law School: Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

School of Engineering and Applied Science: Bachelor of Science (B.S.), Bachelor of Arts (B.A.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Philosophy (Ph.D.)

Graduate School of Education and Human Development: Master of Arts in Education and Human Development (M.A.Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

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Elliott School of International Affairs: Bachelor of Arts (B.A.), Master of Arts (M.A.), Master of International Policy and Practice (M.I.P.P.), and Master of International Studies (M.I.S.)

School of Public Health and Health Services: Bachelor of Science (B.S.), Master of Science (M.S.), Master of Public Health (M.P.H.), Master of Health Services Administration (M.H.S.A.), and Doctor of Public Health (Dr.P.H.)

College of Professional Studies: Associate in Professional Studies (A.P.S.), Bachelor of Professional Studies (B.P.S.), and Master of Professional Studies (M.P.S.)

School of Nursing: Bachelor of Science in Nursing (B.S.N.), Master of Science in Nursing (M.S.N.), Doctor of Nursing Practice (D.N.P.)

ACCREDITATION

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The Law School is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association.

The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The clinical laboratory science program is accredited by the National Accrediting Agency for Clinical Laboratory Science. The Commission on Accreditation of Allied Health Education Programs has accredited the programs in sonography and physician assistant. The physical therapy program is accredited by the Commission on the Accreditation of Physical Therapist Education of the American Physical Therapy Association.

In the School of Nursing, the B.S.N., M.S.N., and D.N.P. are accredited by the Collegiate Commission on Nursing.

In the School of Public Health and Health Services, the public health programs have full accreditation from the Council on Education for Public Health. The program in health services administration is accredited by the Accrediting Commission on Education for

Health Services Administration. The program in athletic training is accredited by the Commission on Accreditation of Athletic Training Education.

In the School of Engineering and Applied Science, the Bachelor of Science programs in civil, mechanical, electrical, and computer engineering are accredited by the Engineering Accreditation Commission of ABET, Inc. The Bachelor of Science computer science curriculum is accredited by the Computing Accreditation Commission of ABET, Inc.

The Graduate School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education and the District of Columbia Office of the State Superintendent of Education for its eligible master's, specialist, and doctoral degree programs; the master's programs in school counseling and clinical mental health counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs; the master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education.

The School of Business is a member of AACSB International–The Association to Advance Collegiate Schools of Business; the Association accredits its undergraduate and graduate business administration and accountancy programs. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations.

The Elliott School of International Affairs is a member of the Association of Professional Schools of International Affairs.

In Columbian College of Arts and Sciences, the B.F.A. and M.F.A. in interior architecture and design are accredited by the Council for Interior Design Accreditation. The

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